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ELEMENTS OF GEOGRAPHY,

OR AN EASY

INTRODUCTION

TO THE USE OF THE

GLOBES AND MAPS;

CONSISTING OF

A CONCISE TREATISE

ON THE

ASTRONOMICAL PART OF GEOGRAPHY,

BLANK ATLAS,

AND

A LARGE COLLECTION OF GEOGRAPHICAL QUESTIONS

FOR THE EXERCISE OF THE PUPIL

ON EACH OF THE MAPS,

WITH THE ANSWERS PRINTED SEPARATELY.

BY JOHN CLEGG.

LIVERPOOL:

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1795.

(ENTERED AT STATIONERS HALL.)

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ELEMENTS OF GEOGRAPHY

OR AN EASY

INTRODUCTION



GENERAL DIRECTIONS

FOR THE USE OF THE

BLANK MAPS.

THE pupil is to observe, that the Letters which are inserted in one of the Maps of any country, refer to the page of Letter Press which is placed exactly opposite to it. The other Map, which is a duplicate of the former, is left entirely blank. On the first he is to study his lesson—in answering the questions, opposite to the second, he proves whether he knows the Map or not; for, I have endeavoured so to construct them, as that their solution shall contain the substance of the information given in the page entitled *references to the Map*. The answers are inserted at the end of the Book, in preference to their being placed immediately after the questions: to these the pupil may refer for assistance, in any difficulties he may meet with, in the first perusal of the work; but it will be advisable, that in the second course of exercises, he should give the solution in his own words; and make a point of varying the expressions as much as possible, as a proof that he is not indebted to the book for them.

It will easily be seen, that it has been necessary in many of the Maps, where the references were numerous, to make use of the Roman and *Italic* characters, both Capital and small, as well as numbers. The difference between the Roman and *Italic* Capitals, is I hope, sufficiently distinct. The pupil may perhaps, at first, find this method of learning a Map a little uncouth; but I am satisfied, if he persist, he will not only overcome every difficulty, but also have obtained a better grounded knowledge of the situation of places, than he could have done by consulting only Maps in which the names are set down. The towers, in these Maps, are not distinguished by any particular mark, as it would have too much crowded them, but when he is told that they are to be read from North to South, and whenever two towers happen to be nearly in a line, the more Westerly is set down first, I hope he will find little difficulty in knowing which circle represents any particular place. Besides; whenever there was any great danger of a mistake in this respect, I have added some note, in *Italics*, which may serve to remove the obscurity. Thus in the Map of Europe, left Riga, and Rishney Novogorod, in Russia, might have been mistaken for each other, I have set down the longitude of the latter. St. Jago, in Spain, is sufficiently distinguished from Oviedo, by its situation near St. Finisterre, being noticed.

Upon the supposition that the pupil will read over the introduction carefully, it would be unnecessary to remark, that the top of the Map is considered as the North, the bottom South, the right hand side East, and the left hand West. There is no exception to this order in these Maps; but whenever from the shape of the Map, and the size of the Paper, it is necessary to insert it. Geographers always give notice of this variation, by placing a *flour-de-lis* on some Meridian, pointing to the North, whence the other points of the Compass may be known.

The degrees of longitude are to be found at the top and bottom, those of latitude are marked at each side.

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ELEMENTS OF GEOGRAPHY.

CHAP. I.

On the Origin and Use of the Circles, and other lines, which are drawn on the surface of the Artificial Globe, and on Maps.

§1. THE figure of the earth which we inhabit, is that of a sphere or globe. The best artificial representation of it, therefore, is a round body. I shall suppose the pupil to be furnished with one of those artificial globes, which are employed in solving geographical problems; and it is the design of this introductory chapter, to teach him the names and uses of the lines which he sees delineated upon it, as a step highly necessary to the proper understanding of the Maps. CHAP. I.

§2. And, in order that he may more easily comprehend the subject, let him imagine the globe to be taken out of the frame which supports it; separated from the brass circle in which it is suspended; the wire which passes through it taken out; and the whole surface of the globe covered anew with blank writing or drawing paper. Indeed, it would contribute much to the clearness of his conceptions, if he were actually to procure for himself a globe that should answer this description, and were to take the steps pointed out in the sequel of this chapter (a). But though this may not be convenient, it is hoped that he will be able to understand what follows, by barely conceiving the globe before him to be stripped of its appendages, and covered with paper perfectly blank.

§3. Let him then consider what may be remarked respecting the figure of the globe. He will observe that no part of its surface is distinguished from another in shape: It has no corners: He cannot speak of its sides: It is every where uniformly round. If he attempt to draw a straight line upon it, he will find that he has described a part of a circle. Held at a distance from the eye, the line by which its figure is bounded appears to be the circumference of a circle (b). Removed so far as to weaken the effect of light and shade, he can hardly distinguish it from a perfectly flat, round surface.

§4. Pursuing his examination, he may conceive of a point in the inside of the globe, which is exactly at the same distance from every point on the outside; and this he may call its *Centre*. An imaginary line passing through the centre, and extended each way to the surface, may be denominated the *Axis*; and the two points on the outside where this line terminates, may be called the *Poles*. If the Globe be put into motion, he will have an idea of the Axis, as being that line about which every part of the sphere revolves; except the two Poles which are at rest whilst all other points of the surface

(a) Directions for covering the surface of a globe with paper, will be found in the Appendix.

(b) See the definitions of these and other terms in the Appendix:

CHAP. I. are carried round the Axis, describing circles large or small, as they are nearer to or farther from the Poles, the largest being that which is at an equal distance from both of them. Thus he will have obtained two points on the surface of the Globe, which are distinguished from the rest, in having no motion produced by the rotation of the globe on its axis; let him now proceed to consider what use may be made of this discovery.

§5. If the piece of wire be again thrust through the globe, to represent the Axis, and the globe suspended by the two ends of this wire, so as to turn freely in the inside of the brass circle (one side of which the pupil will perceive to be marked with 360 small divisions called degrees)(a), it will appear evident to him, that the nearest distance of any point on the surface, from either of the Poles, may be measured by means of this graduated or divided circle. For if he turn the globe upon its Axis, till the given point lies under it, he may count how many of those degrees or small divisions, are included between it and either Pole.

§6. With the help of this brass circle too, any number of lines may be drawn on the surface of the globe, quite round it, and crossing each other at both Poles. To distinguish the circles thus drawn, from any other which it may be found convenient to trace, let them be called *Meridians*; and the brass circle, by means of which they are delineated, the *General Meridian*.

§7. If a pencil be held close to the brass Meridian, at that division which is equally distant from both poles, that is ninety degrees from each, and in such a manner, that when the globe is turned upon its axis, the point of the pencil may trace a circle upon its surface, this circle will divide it into two equal parts or Hemispheres, and may therefore be, very aptly, called the *Equator*, and divided in the same manner as the Meridian, into 360 degrees. The Equator will then become a scale for measuring distances, in a different direction, from the Meridian, that is from the right to the left hand, or the contrary.

§8. The pupil will now, perhaps, perceive a very obvious division of the General Meridian into four larger parts, each containing ninety degrees: for its graduations are evidently distributed into two equal parts by the poles; and the ninetieth degree from each pole is distinguished from the rest, by the circumstance of its lying over the Equator: so that in speaking of the position of any point on the globe, he may either mention its distance from one of the poles, or from the equator towards that pole to which it is the nearest: and, if he examine the brass circle, he will find, that a provision has actually been made for either mode of reckoning, by numbering the divisions on each half of it in different directions. He may likewise remark, that the termination of every fifth degree is distinguished by a stroke something longer than the single degrees, and that of every tenth degree by one still longer.

§9. The next enquiry may be; from what point of the Equator the numeration of its degrees is to commence; since no one of them is, as yet, distinguished from another, all being equally distant from each pole, and none related to the Meridian more than another, except by the circumstance of lying under it, which is the case with all of them successively, as the globe turns upon its Axis.

§10. Let a Meridian be drawn on the surface of the globe, by applying a pencil to the brass Circle, and call this the *first Meridian*. Mark one of those points of the Equator, which is crossed by it, with a cipher; and from hence let the computation begin, taking the same steps with respect to every

(a) Mathematicians have agreed to consider the circumferences of all circles, as divisible into 360 equal parts, called degrees, which are distinguished by this mark being put over them ($^{\circ}$). The subdivisions of a degree are minutes, marked thus ($'$), seconds, thus ($''$), and thirds, thus ($'''$), each a sixtieth part of that which precedes it: that is, a minute is the sixtieth part of a degree, a second the sixtieth of a minute, &c. The reasons for their adopting these in preference to any other numbers, seems to have been, that, when they are subjected to division, the quotient is seldom clogged with a remainder; thus the half of 360 is 180; the third of it 120; its quarter 90; the fifth part 72; its sixth 60: its eight 45; its ninth 40; its tenth 36; and its twelfth 30. The remark applies, though less generally, to the number 60.

fifth and tenth degree, as have been observed in graduating the brass Meridian. It is evident, if the numeration be carried forwards regularly on each side of the *first Meridian*, to the right and left hand, it will terminate in 180 degrees, at that point of the Equator which is exactly opposite to the one marked with a cipher. CHAP. I.

§11. By means of these two graduated circles, the Meridian and the Equator, distances may be measured in two directions, that is, from the Equator towards either Pole, or from the first Meridian to the right hand or to the left. Now the former of these measures corresponds with what is meant by the *Latitude*, and the latter with what is understood by the *Longitude* of a place upon the Earth. In other words; *the Latitude of a place is its distance from the Equator, and its Longitude is its distance from a certain Meridian, called the first Meridian(a).*

§12. The Latitude and Longitude, of every place of note in the world, have been discovered by astronomical observations (which are conducted upon principles explained in the sequel of this work) and have been collected and arranged into Tables, which may be found in most books of Geography. With the assistance of one of these tables of Latitude and Longitude, the pupil might proceed to mark down upon the globe, thus previously prepared, the situation of all the principal places in the world; and afterwards, by the help of a map, he might delineate the outlines of the various countries into which the earth is divided. Thus, finding in the Table that the Latitude of London is about $51\frac{1}{2}$ degrees, and its Longitude *nothing* (the Meridian of London being adopted by English Geographers, as the first, he may find a point on the surface of the Globe, upon which a mark being made, it will represent the city of London. For, bringing the cipher (*Chap. II.*) on the Equator, to lie under the brass circle, and counting $51\frac{1}{2}^{\circ}$ on it towards either Pole, the point on the surface of the globe, immediately under that division, will be the situation of London, and the Pole towards which the reckoning was made must in future be considered as the North, and the opposite one the South Pole. Again, the latitude of Petersburg will be found in the table to be about 60° North, and its longitude 30° East. If the latter number be counted on the Equator, from the first Meridian, towards the right hand, and brought under the brass circle; the point, on the surface of the globe, exactly under 60° on that circle, counted from the Equator towards the North pole, will represent the situation of Petersburg(b).

(a) The choice of the *first Meridian* is entirely optional. In most old maps the longitude is reckoned from the Meridian of Ferro, one of the Canary Islands; because in the infancy of Geography, that was the most Westerly land which had then been discovered. Modern Geographers generally adopt the meridian of the metropolis of their own country as the first. Thus the English commence the numeration of their longitude from London; the North Americans from Philadelphia, &c. It is to be lamented, that national vanity has thus introduced confusion into the language of science, but, we have to hope that the same feeling of the convenience of uniformity, which has led Philosophers to generalize the nomenclature of Chemistry, Botany, &c. will induce Geographers to relieve their students from the perplexity of entering into the calculation necessary to reconcile the varieties in the reckoning of longitude: For, in consulting a map, if we wish to adapt the longitudes found in it, to those in one where it is computed from another meridian, we have to add or subtract the distance of those meridians from each other. Suppose, for instance, that in a map where the longitude is reckoned from Ferro, I find a place which is 30° to the East of that Meridian, and I want to know its longitude from London, which lies $17^{\circ}-40'$, to the East of Ferro, the difference between 30° and $17^{\circ}-40'$, which is $12^{\circ}-20'$, gives me the Longitude of the place, East from London: But, had the place lain between London and Ferro I should have subtracted its longitude, as reckoned from the latter, from $17^{\circ}-40'$: And had it lain to the Westward of Ferro, that is beyond Ferro from London, the $17^{\circ}-40'$ must have been added: all which shews how desirable it is that some one meridian should be universally adopted as the first.

(b) The pupil will, by this time, it is hoped, understand, better than by any concise definition, *the Origin of the Axis, Poles, Equator, and Meridians*. Every place laid down on the Globe, may be imagined to have one of these latter circles drawn through it: but, to avoid confusion (and to answer another purpose, which will be noticed hereafter) the number on the globe is confined to *twelve*. The Circles he will perceive described at the distance of 10° of the Meridian from each other, on each side of the Equator, and which diminish in their circumference as they are nearer to the poles, are called *Parallels of Latitude*, because they are parallel to, or every where equally distant from, the Equator, and each other. They are of use in assisting the eye to judge rudely of distances, without having always the trouble of recurring to the graduated meridian: the number described is merely arbitrary, as they might have been twice, or only half the present number.

ELEMENTS OF GEOGRAPHY.

CHAP. I.

§13. But the pupil may probably find it difficult to conceive, how the terms Meridian and Equator can be applied to the Earth. He may, perhaps, easily comprehend their use in computing distances on an artificial globe; yet, though he admit the Earth *itself* to be of the same shape, "How is it," he may ask, "that we can know where the Poles of the Earth *are*?" He has been taught, I will suppose, that the Earth has such a *motion* as was given to the artificial globe, in order to discover its Poles; or, in other words, that day and night are caused, not by the Sun's going round the Earth every 24 hours, but, by the rotation of the latter upon its Axis in that time^(a): yet, since we cannot *perceive* this motion, he may think it impossible for us to discern *by experience*, where there is *no motion*, which is the definition that has been given of the Poles: and, even supposing these points on the surface of the Earth to be discovered "by what means, are the relative situations of *other* places with respect to them and to one another to be obtained?"

§14. The general answer to these inquiries is, "that by observing what takes place *above* the Earth, that is among the heavenly bodies, we are enabled to determine the position of places *upon* the Earth?" For the farther illustration of the subject, the pupil is referred to the next chapter.

C H A P. II.

On the methods made use of, for finding the Latitude of any place, by observation.

CHAP. II.

§1. **O**UR view, in a level country, but particularly at sea, where the sight is not obstructed by any inequality of surface, is always bounded by an apparent circle where the sky and land seem to meet; and this circle is called the *Horizon*. It is in some part of this circle that the Sun, Moon, and Stars, first come into view, and are said to *rise*: and in the opposite one they disappear, and are said to *set*. Hence have arisen the distinctions of North, South, East, and West. We say that the heavenly bodies rise in the East, and set in the West, &c. that "the Sun is South at noon," and the general direction, for *knowing* the four Cardinal Points, as they are called, is, after remarking the direction of the Sun from us at noon, to remember, that the opposite point is the North; and, that when our face is turned to the North, the West will lie to the left, and the East to the right hand; and when we look Southwards, the contrary.

§2. But the pupil can hardly have been so inattentive to what has taken place about him, as not to have observed, that the Sun neither rises nor sets in the same point of the Horizon at every season of the year; but that in Summer the place of his first appearance in the morning is considerably to the *North* of the East: and, that when we lose sight of him in the evening, he appears as far to the North of the West, if we make our observation on the same day. These appearances are reversed in Winter, the points in which he rises and sets being on the other side, that is, to the *South* of the East and

(a) We are led to the belief of the daily rotation of our earth upon its Axis (though contrary to the immediate testimony of our senses) from the absurdity of the supposition, that the Sun, Moon, and Stars (which are at immense and very unequal distances from us) should, every 24 hours, perform circuits about the Earth, of inconceivable extent, for the purpose of furnishing us with light and heat; when the same end might be answered by the much more simple contrivance of the Earth's turning upon its Axis: by which means every part of its surface is alternately presented to the Sun, and the succession of day and night regularly produced: especially as it can be demonstrated, that the magnitude of the Earth, in comparison with that of the Sun, is no greater than the bulk of a common pea, to that of an artificial globe of twelve inches in diameter. There is likewise sufficient reason for us to believe, that those bodies which are called *fixed stars* (though they appear to us only like lucid points) are themselves Suns to other Worlds, and some of them perhaps actually much larger than that which supplies us with light and heat. The supposition, that these huge masses of matter, which are by their distance diminished to mere specks in our eyes, should perform revolutions, ample in proportion to those distances, round so insignificant a ball as our Earth is, in comparison with them, is so contrary to our ideas of the wisdom of the creator, that it has been discarded by all men of science, and has given place to the much more beautiful system of the motion of the planetary orbs upon their own axes. An ingenious author has set this matter in a striking point of light, by hinting, that it would be as absurd to conceive even the sun alone, to be carried daily round the Earth, as it would for us to attribute wisdom to one, who, in order to roast a fowl, were to lay aside the spit, and contrive to carry the fire round the fowl.

West. He must have observed too; that the Sun is higher or more nearly over head at noon, in Summer than in Winter; and that the higher the Sun is, the shorter are the shadows of upright objects. CHAP. II.

§3. But, in order that he may remark these appearances in future, with more advantage; and apply them to his improvement in geographical knowledge; I shall, here, give him some directions, for the construction and use, of a very simple and cheap *apparatus*, which, though it may not furnish him with the means of making the nicer and more accurate observations will, I hope, enable him to conceive, more clearly, the principles upon which, many problems in Geography and Astronomy are founded; and consequently qualify him for *solving* those problems with less dependence upon the mechanical directions which are set down in treatises on the use of the Globes and Maps.

§4. Upon a board, about a foot square, draw four or five circles; all of them having the same centre; and at the distance of a quarter of an inch from each other, the outermost one being nearly as large as the board will admit. In the centre of the circles fix perpendicularly, or exactly upright, a wooden peg of about five inches long, and one-eighth of an inch thick, having a blunt round point. Let the board thus prepared, be placed exactly level^(a) in an open place where the peg may always cast a shadow upon the board, when the Sun shines. Let the pupil then observe when the shadow of the peg falls just within the outermost of the circles; and having made a mark at the point where it terminates, let him note the time, either by writing it with a pencil on the board, or on a separate scrap of paper. The use of this memorandum is, that he may know at what time, in the afternoon, he may expect the shadow to fall just within the same circle, in some part of its opposite half; as this will always happen exactly as much *after* twelve as the first observation is made *before* twelve: at which time it may be necessary for him (as he will perceive by what follows) to repeat the observation. By attending to the progressive shortening of the shadow (for, as was before observed, the length of the shadow decreases as the sun advances in height) he will be enabled to judge, how soon the extremity of it will fall exactly on the next interior circle; and he must be careful either to wait that interval, or return time enough to mark where the end of it falls, and to set down the corresponding time. The intervention of a cloud, may, perhaps, prevent him from making a similar use of any more of the circles: but, if he be fortunate enough, to obtain two points in any one circle, where the shadow has terminated, he will be enabled to draw a line, which shall have exactly the direction in which the shadow of the peg fell at noon: for, as the sun is exactly at the same height from the Horizon, at equal intervals of time from noon, it is evident, that the middle point between those just found, must lie in the direction of the shadow of the peg at twelve o'Clock: so that if a line be drawn through that point and the centre of the circle, it will be a *Meridian, or true North and South line*. This middle point may be obtained, by setting one foot of a pair of compasses in each of the points, and extending them to more than half the distance between the two points, then drawing two arches to cross each other and laying a ruler over them where they intersect, it will cross the circle in the point exactly half way between them.

§5. If instead of the peg a small upright wire be substituted, the exact time of noon may, in future, always be known, by the shadow of the wire falling upon the line thus found; and other Meridians may be drawn, by marking the shadows of perpendicular objects at that time. The Meridian line may be considered as the basis of all astronomical observations; and I shall now proceed to shew its use in determining the Latitude of a place; first making some preliminary observations on the nature of shadows.

§6. The shadows of all upright objects, are invariably cast in precisely the same direction, at that moment of time when the sun is at his greatest altitude, or height above the horizon; and, as

(a) This may be done with sufficient accuracy by means of a common carpenter's level.

CHAP. II. this happens at nearly equal intervals of time, machines called clocks have been constructed, to measure the smaller portions of that interval. Thus, the period between the Sun's leaving that part of the heavens where he was highest, and his return to it again, is by a clock divided into 24 larger parts called hours; these again into smaller ones called minutes, and the division of a minute into seconds is pointed out, in most of our modern clocks, by a separate finger, and is distinguishable in all, by attending to the vibrations of the pendulum. But, as the best constructed clock is subject to some imperfections inseparable from all works of art, whilst the operations of nature are constant and invariable, (or, the varieties of which, governed by uniform laws, are capable of being foreseen and calculated) we rectify the motions of our clocks and watches, by attending to that of the Sun, and for this purpose make use of dials; which, when carefully constructed, point out to us the return of the sun to that part of the heavens which we call the South.

§7. The pupil must have observed, that the upright part of the Dial, called the stile, gnomon, or hand, is fixed to the plate, which is placed exactly level with the horizon; so that, its casting a shadow in any particular direction, must always denote the return of the sun to that part of the heavens in which he was when the shadow was precisely in that direction before. But, a moment's consideration will shew him, that the *direction* of the shadow, is not at all dependent upon the *height* of the sun above the horizon. He will also, by pursuing the idea discover, that if the Sun were exactly *over* any upright object, there would be no discernible shadow. If the Sun were exactly over his head, the shadow of the upright part of his body would fall at his feet, instead of being cast, either to one side or another. Thus, *the point over head* becomes distinguished; let us give it a name then, and call it, with those who have considered the subject before us, *the Zenith*.

§8. Upon a farther investigation of the doctrine of Shadows another manifest distinction arises, respecting the application of the word *height*. This term commonly signifies, the distance from the surface of the Earth: but, when it is used to express the height of the Sun, considered in connexion with the lengths of shadows, it cannot mean any such thing: for the pupil will perceive, that the *distance* of the sun, from any upright body that casts a shadow, has no effect in *lengthening* the shadow, if the direction of the Sun's rays continues the same. If he imagine a line drawn from the centre of the Sun over the top of the upright body, and continued from thence to the surface of Earth, it will mark out where the extremity of the shadow falls. Now, let him suppose the sun to advance ever so far towards the earth, along this line, no alteration would take place either in the *direction* or in the *length* of the shadow. A pin placed perpendicularly on a table, and a candle being held so as to cause the shadow of the pin to fall in a certain direction, to any given length, may serve to illustrate this: the candle may be carried to any distance from the top of the pin, without changing the *direction* or the *length* of the shadow of the pin: but then, it must be removed in such a manner as always to be in a line with the top of the pin, and the place where the shadow terminated at first. This shews then, that the term *height*, as applied to the Sun, and other heavenly bodies, must mean something different from what it does when used to signify the distance of any thing, or the top of any thing, from the surface of the Earth: and, consequently, must require a different mode of expressing the quantity of it. We say that such a tree is so many feet high: that such a mountain is a certain number of yards above the level of the sea: but these kind of computations are not applicable to what is called the height of the Sun, in the view we are taking of it.

§9. The sky appears to inclose the Earth, as one globe may be imagined to inclose another. The heavenly bodies all appear exactly at an equal distance from us; and may be considered as so many points on the inner surface of a large sphere surrounding our earth.—If I point to a star which appears just in the *Horizon*, and carry my finger leisurely upwards till it is directed to another star in the *Zenith*, I can conceive that I have traced an *arch of a circle* in the heavens. An idea is by this means suggested, that in speaking of the distance of any two points on the surface of the heavens, the same mode of computation may be used as was adopted in estimating distances on the surface of the Earth: But how are they to be measured? The eye alone is very incompetent to judge with accuracy, of the proportion which any small part bears to the whole of such immense circles, as we shall have occasion to imagine delineated on the vast sphere of the heavens.

§10. If a piece of wire be placed exactly perpendicular, in the middle of a basin, and of the same height with the edge of the basin; by attending to the shadow of the wire, as it falls in the inside, we may have an idea of the arch which the sun passes over in the heavens^(a) in the course of the day: for, it is evident, that as the sun rises above the Horizon, the shadow will terminate farther and farther from the edge of the basin: and if the inside of it be exactly hemispherical, or a half globe, the experiment will always furnish us with an exact measurement of the altitude of the sun, which may be estimated by means of a piece of wood or pasteboard, cut into a quadrant or quarter of a circle, so as to fit the inside of the basin, and its edge divided into ninety degrees; which being applied to the shadow, will point out the number of degrees at which it terminates from the edge of the basin: and this number of degrees will denote the portion of a great circle in the heavens, drawn through the Zenith and the Sun, which lie between him and the Horizon^(b). But as this is an apparatus not easily procured, let us consider what other more easy mode of investigation the subject is capable of.

§11. It has already been necessary to call in the aid of the imagination, to conceive of a line drawn from the centre of the sun, over the top of the wire, and continued to the surface on which the shadow is cast, in order to point out where it terminates. Let the pupil pursue the idea, and reduce it to actual representation, by drawing two lines perpendicular to each other, which shall have the same proportion to each other, with respect to length, as the shadow and the wire have. Suppose, for instance, that the length of the wire be ten inches, and that of the shadow eight; let him draw a line to represent the surface on which the shadow falls, and from a scale of equal parts set off eight divisions: then, at one end of it erecting a perpendicular, to represent the wire; let him set off ten of those divisions upon it: a third line, drawn through the ends of these two lines, will represent the direction of a ray of light, passing from the sun, over the top of the wire, at the time of its casting the shadow of eight inches long; and the angle which is formed by this last line, and that representing the length of the shadow, will give the altitude of the sun; which may be measured according to the directions in the appendix^(c).

§12. The heavenly bodies, as was before observed, appear exactly at the same distance from us, and may be considered as so many points on the inner surface of an immense sphere, every where surrounding the Earth; but one half of which only is visible to us at a time, the other being hid by the roundness of the Earth. The Horizon, then, may be conceived of as a large circle, dividing the visible from the invisible half of this vast concave surface; and any number of circles may be imagined to be drawn from the Zenith, through any of the heavenly bodies, crossing the Horizon, in the same manner as the Meridians, on the Terrestrial Globe, were described, over any place on its surface, passing through the two poles, and crossing the Equator^(d). The distance of the Sun, Moon, or a Star,

(a) In this, as in many other instances, it is convenient, in order to avoid circumlocution, to speak of things as they appear to be, rather than as they really are. When we have once admitted, that the apparent motion of the sun is caused by the real motion of the Earth, there will be no danger of our falling into error, by using popular language, and saying, that the sun rises, comes to the meridian, sets, &c.

(b) Such a circle is called by Astronomers a Vertical or Azimuth Circle.

(c) As this essay is designed for the use of those who are not skilled in the Mathematics, I have chosen those methods of illustration, which require only so much previous knowledge of Geometry, as may be learned from the Appendix: and this is no more, than what is absolutely necessary to the understanding of the subject. The object I propose to myself, is, not to enable the pupil to make accurate calculations, as that would require a larger treatise, and more properly belongs to Astronomy, but, to lead him to an acquaintance, with the principles upon which those calculations are founded; principles which arise merely from the relation which the Earth bears to the bodies which surround it, and therefore are to be considered as a material branch of Geography. The student in Trigonometry needs not to be told, that the angle which measures the altitude of the sun, in the above case, may be determined by calculation. For, considering the line, which represents the length of the shadow, as radius; the perpendicular, representing the wire, will be the tangent of that angle.

(d) The point in the heavens exactly opposite to the Zenith, and corresponding with the other pole, on the Terrestrial Globe, is called by Astronomers the Nadir; and the Circles drawn through these two points, Vertical Circles, or Circles of Altitude.

CHAP. II. from the Horizon may, then, be considered as an arch of one of those circles; and be expressed in degrees, minutes, &c. as the Latitude of a place is the arch of the Meridian, lying between any place and the Equator.

§13. The Altitude, or the height of the Sun, or the Moon, may be found by observing the length of the shadow which any upright body casts. For, if we consider the point where the shadow ends, as the centre of the circle of Altitude; and a line drawn from the Sun or Moon, over the top of the body which casts the shadow, to that point, as one radius; and an imaginary line drawn from the Horizon to the same point, as another radius; the number of degrees, contained by the angle which is formed by these two lines, will be the number of degrees, in that portion of the Circle of Altitude, which lies between the Sun, or Moon, and the Horizon.

§14. The application of this observation of the altitude of the Sun or Moon, to the determining of the latitude of the place where the observation is made, will appear obvious to the pupil, when he considers, that as the centre of the sphere of the Heavens, is the same with the centre of the Earth, which is likewise the centre of every circle drawn, either on the convex surface of the Earth, or the concave surface of the heavens; so, any point on the one must have a point corresponding to it on the other. The Zenith, for instance, is a point in the heavens, which would be marked out, by an imaginary right line drawn from the centre of the Earth, through the place of an observer, on its surface, and extended to the heavens, over his head; and any two opposite points in the Horizon (as it divides the heavens into two equal parts) (§12.) must be marked out, by a line drawn perpendicular or at right angles to that (*a*). Now, if at any time we know to what part of the world the sun is vertical, or over head (*b*), and observe how many degrees he is from *our Zenith*, at noon, (which may be found by subtracting his altitude at that time from 90 degrees, the distance of the Horizon from the Zenith) we shall have the difference of Latitude, between the place to which he is vertical, and the place where we make the observation. Suppose, for instance, that, on any day when the sun is known to be vertical to all places which have 10° degrees of North Latitude, I observe his altitude when exactly South at noon, to be 60° , his distance from my Zenith is evidently 30° ; and, consequently, my Latitude must be that number of degrees more than the Latitude of the place to which he is vertical; in other words, my Latitude must be 40° North of the Equator. But had the sun been vertical, on the day of observation, to a place 10° degrees to the South of the Equator, my Latitude would have been only 20° North, the Equator in that case lying 10° nearer to me than I did to the place where he was in the Zenith at that time: Or, had the sun been to the North of me, that is, had I made the observation from a place in South Latitude when his declination was North, the result would have been the same as in the last case (*c*).

(*a*) The circle which bounds the view on the surface of the Earth, and which has the place of the observer for its centre, is called the *Sensible*, and that which is described on the surface of the heavens, having the centre of the earth for its centre, is called the *Rational Horizon*. The magnitude of the Earth is so small, in comparison with the distance of the heavenly bodies, that whether they be viewed from the surface, or from the centre of the Earth, they will have so nearly the same appearance, that no material mistake is committed by referring the appearances in one circle to the other.

(*b*) The Latitude of the place to which the Sun is vertical on any day, or his distance from the Equator, is called his declination, which is pretty nearly the same, on the same day of the month of every year. The method of determining the place of the Sun amongst the heavenly bodies, and consequently his declination will be shewn in the sequel.

(*c*) Hence arises this general RULE for determining the Latitude of any place, by observing the Meridian Altitude of the Sun or Moon.

The Latitude of a place is equal to the SUM of the Zenith Distance and Declination, when they are of the same name, or both North or both South: but, the Declination is to be SUBTRACTED, when they are of different names.

N. B. I have not taken any notice of the corrections which are used when the observation is made for nice practical purposes, but have thought it sufficient to give the pupil a general idea of the manner of taking the observation, and of applying it to the discovery of the Latitude. If the pupil have a relish for the study, he may be assisted in the pursuit of it, by the perusal of the larger treatises on Astronomy.

§15. The same use may be made of the Meridian Altitude of the Moon, or any of the fixed Stars (a). For, if we know their declination, or distance from the Equator at the time of observation (which is to be found in Almanacks, annually published) we may tell our own distance from the Equator; by either adding or subtracting that declination from their distance from our Zenith (b). But the Altitude of the fixed Stars cannot be observed, by the method which has been pointed out above, for ascertaining that of the Sun and Moon: since their light is not strong enough to cast a shadow. It may be obtained, however, by an instrument called a Quadrant, of which there are various kinds; but the most simple, and that which will be quite accurate enough, for our present purpose, may be made by cutting a flat board, into a quadrantal form, and dividing its curve edge into 90 equal parts. For instance, with a radius of 12 inches let a quarter of a circle be described upon a board: then draw a line through the centre and a point in the arch equally distant from both its extremities; that is, through the 45th degree, and let this line be continued to some distance beyond both the centre and the arch. Set off half an inch from the centre, on this line, and on the other side of it to that on which the arch lies. From this point, and with the radius of 13 inches, draw another quadrant; and let the wood be cut into the shape of this latter one. Then divide the curve of the smaller one into 90 equal parts, numbering them from the left hand edge. At the point where the foot of the compasses were set to describe the smaller quadrant, fix one end of a thread, with a small weight, or plummet hanging at the other end, and so long that the plummet may fall just beyond the edge of the larger quadrant (c), on that side which is graduated. Then, if a Star be looked at, along the edge of the instrument, placing the eye at that corner where the 90th degree falls, and the string be suffered to hang freely, that degree of the smaller quadrant, over which the string falls, will be the altitude of the Star. The reason of this is so obvious, as scarcely to need any illustration: for, if the Star be in

(a) By attending to the appearances which take place among the heavenly bodies, it is discovered, that, whilst most of the Stars constantly keep at the same distance, and in the same direction from each other, there are a few which change their situations, being sometimes found in one part of the heavens, and sometimes in another. The former of these are called by Astronomers *Fixed Stars*, and the other *Planets*, or *Wandering Stars*. The Sun, Moon, and all the heavenly bodies appear equally remote from us: but Astronomy teaches us, that their distances are very *unequal*. That the Moon is nearer to us than the Sun, is evident from the Eclipses which take place with respect to those two luminaries. For, it frequently happens, that the light of the Sun is prevented from falling upon the Earth, by the Moon's passing between us and him; and this we call an Eclipse of the Sun, though it ought more properly to be called an Eclipse of the Earth: for it is the shadow of the Moon, falling upon that part of the Earth immediately under her, which causes the appearance to us. But, to an observer in the Moon, it would appear as if a dark spot passed over the Earth at that time. In the same manner, whenever our Earth happens to come between the Moon and the Sun, the rays of light from the latter (which are the cause of the light of the former, the Moon having no light of her own) are intercepted by the Earth, and prevented from falling upon the Moon, at which times we say the Moon is eclipsed. This may be familiarly illustrated, by carrying a small globe, to represent the Moon, round a larger one, representing the Earth, whilst a candle is placed at some distance from both, to serve the purpose of a Sun to them. The other bodies, which move amongst those which are fixed, are Mercury, Venus, our Earth, Mars, Jupiter and Saturn, all of which are visible to the naked eye: A seventh has lately been discovered by Mr. Herschel, and, in honour of his Majesty, is called the Georgium Sidus. The laws which regulate the motions of these planets, and the various appearances which they present to an observer, belong to the science of Astronomy; to treatises upon which subject the pupil is referred for farther information.—It may not be improper, however, to remark here, that the planets above enumerated, whilst they perform their revolutions round the Sun as a centre, are accompanied in their course by smaller bodies called Satellites or Moons. That which attends our Earth, and supplies us at seasons with light during the absence of the Sun may furnish us with an idea of the uses of those which are discovered to revolve about Jupiter and Saturn; the number of those belonging to the former is four, and to the latter is five. These, as well as our Moon, are subject to be eclipsed; and very important uses are made of those appearances by Astronomers, as will be noticed, when we come to speak of the method of discovering the longitude of places on the Earth.

(b) The Almanack, called White's Ephemeris, is a very necessary companion to the Globes. In the 46th page of that work, there is a catalogue of the principal Fixed Stars, with their declination, &c. Suppose I observed the Meridian Altitude of the Star Arcturus to be 60° , his Zenith distance must be 30° , and in the table page 46, of the Ephemeris, I find his declination to be 20° North, and consequently the Latitude of the place of observation, must be 50° , because in this case the declination must be added to the Zenith distance (vide note c. p. 8).

(c) There is no expression to distinguish between the lines described on the Wood, for the purpose of making the instrument, and the instrument itself. I hope, however, the pupil will not be misled into the idea, that I am here speaking of two separate pieces of wood.

CHAP. II. the Horizon, it is evident that the plumb line will hang over the cipher, when the observer views it with his eye placed at that corner of the instrument where the numeration of the degrees terminates : and, if in the Zenith, the string will hang over the 90th degree : but, if at any intermediate height, its distance above the Horizon will be denoted by a proportionate arch on the edge of the quadrant.

§16. The inhabitants of the earth, who cannot perceive its motion, but who are actually every moment changing their position with respect to the heavenly bodies will attribute that motion to them. As to a person travelling in a carriage on a smooth road ; or in a passage boat on a canal, the objects at a distance seem to move with equal rapidity, but in a contrary direction ; so, we imagine the stars to be carried from East to West, in consequence of our being carried, by the motion of the Earth, from West to East. By this motion of the Earth we are constantly losing sight of some stars, in the West, and brought into the view of others in the East.

§17. A little consideration will convince the pupil, that, in consequence of the figure of the Earth, and the nature of its motion, the appearance of the heavenly bodies must be very different, to the inhabitants of different parts of the Earth. For instance, he will perceive, that as only one half of the heavens can be visible at one time (the other half being hid by the roundness of the earth) so any two persons, viewing the heavens from different parts of the Earth, must see a very different set of stars. Thus an observer at the North pole can never, by the rotation of the Earth, be brought in sight of all that set of stars, which are visible to those who live between the Pole and the Equator : whilst an inhabitant of that part of the Earth which lies exactly half way between the Poles, or at the Equator, in the course of 24 hours is presented with a view of every part of the heavens ; and, were it not for the superiour brightness of the Sun, which overpowers that of the stars in the neighbourhood of him, he would have a view of every star which is visible therein. The medium between these two extremes, that is between those who never see more than half, and those who (a) see all the stars that are visible to the inhabitants of the Earth, are they who, living between the Equator and the Poles, see a larger or a smaller portion according to their distance from thence. But this will appear more clear to him, if I refer him to the Celestial Globe : first informing him, that, as the *Terrestrial Globe* is a picture of the Earth, so *that* is a representation of the heavens : that on its surface he will find the *Stars* laid down, and that for the convenience of finding them with greater ease, they are classed into what are called constellations, which are nothing more than fanciful arrangements of them, under the figures of men, or animals. He will observe, that this Globe, besides those circles which are found on the other, has several additional ones : I wish him not, however, to pay any attention to these at present ; but to confine his notice, to the correspondence there is between the two, with respect to the situation of the Stars in regard of the Equator and the poles ; as it is upon this circumstance that I wish to found his knowledge of the means for discovering the latitude of any place.

§18. Now the most obvious property of the Globe as it is considered in connection with the Horizon (which divides it into two equal parts) is, that the number of degrees which lie between the Pole and that circle, in any position of the Globe, is, always equal to the number of degrees which lie between the Equator and the Zenith point, or that point which is exactly 90 degrees every way from the Horizon ; so that, if the Globe be placed in such a manner as to represent the position of the sphere of the Heavens at any place, it must be set so as that the elevation of the Pole above the wooden circle, representing the Horizon, may be equal to the latitude of the place. Suppose for instance that I observed the Star Castor in the constellation Gemini or the Twins, to be exactly vertical, or overhead to me, I should discover that my latitude was equal to the distance of that Star from the Equator ; which, upon applying to the Globe, and placing the Star under the brass Meridian I find to be a little more than 32 degrees and a quarter. Now if I wish to find what set of Stars are visible in the course of the year at the place where I am, as well as to know which of them never set, and which never rise,

(a) The pupil must keep in mind, that, *only one half* of the heavens is ever visible at *one time* ; and that this expression is not meant to convey an idea of any precise *number of stars* ; but one half of that *space* in which the stars appear, considering them all along as they seem to be, equally distant from us, and fixed on the inner surface of a large surrounding globe.

I should have nothing more to do, than to count as many degrees from the Pole, on the brazen Meridian, as the Star Castor is from the Equator; and by this means I shall elevate that Star to a point every way 90° distant from the Horizon, which is the definition given of the term Zenith in §7. Then, by turning the Globe upon its axis, it will be seen which Stars always continue above the Horizon, and which never become visible. CHAP. II.

§19. I hope the pupil will easily perceive then, that by observing what Stars pass through the Zenith, or over-head, the latitude of the place may be determined by consulting the Globe, and seeing what distance any one of those Stars is from the Equator(x)—Or if no Star pass exactly over-head; yet, if he observe any that just touches the North point of the Horizon, without entirely disappearing, the distance of that Star from the Pole will be his latitude—Again if he take the altitude of any Star to the South of him, when it is on the Meridian, he may tell his latitude, by either adding the distance of the Star from the Equator to its distance from his Zenith, or subtracting it. Suppose, for instance, I observed the Meridian Altitude of the Star Aldebaran, in the constellation of the Bull, to be 66° , its distance from my Zenith must be 24° . But, upon consulting either the Globe, or White's Ephemeris, I find that that Star which is South from me, is a little more than 16 degrees to the North of the Equator; consequently, the Equator is a little more than 40° to the South of me; in other words, my latitude is a little more than 40° North: So that the same rule will serve for finding the latitude of a place by an observation of the Meridian altitude of a Star, as was given in Note c. p. 8. for working an observation of the Sun or Moon.

§20. The greatest and least height of one of those Stars, which never set in any place, added together and divided by 2, will also give the latitude or height of the Pole at that place. Suppose for instance, that I observed the altitude of the Star Aliath, in the tail of the Great Bear, when on the Meridian, below the Pole, to be 100° , and when at its greatest height, that is when between my Zenith and the Pole, to be $75^\circ-46'$, the sum of these two altitudes will be $85^\circ-46'$, and their half $42^\circ-53'$, will be the height of the Pole above my Horizon, or the latitude of the place where the altitudes were taken. The reason of this rule, it is presumed, is so obvious, as not to require any farther illustration than what the pupil may acquire from an inspection of the Globe, and the proposing of a few examples to himself.

§21. The pupil has not yet been informed of the subdivisions of the Horizon into degrees, and what are called *the points of the Mariner's Compass* (y). The former consists of 90 equal parts, in each quarter of the circle, upon the same principle as the division of the Meridian and the Equator. Thus he will find that from the East and West, to the North and South points, which as was before observed, are called Cardinal points, these degrees are numbered 10, 20, 30, &c. from the former to the latter, in a circle, upon the inner edge of the Wooden Horizon: And, that in an outer circle, every $11\frac{1}{4}^\circ$ has a term subjoined to it, combined of two of the Cardinal points: Thus the middle point, or the 45th degree, between the N. and W. is marked N. W. or North West; the middle point between South and East, is called South East, &c. This division extends to 32 parts, and is principally used by Mariners(z).

(x) The distance of the Star from the Equator is not called its latitude, but its declination; the former term having a different meaning when applied to the Celestial Globe, as will be shewn hereafter.

(y) The Mariner's Compass was a very important discovery, made about the year 1302. It consists of a circular box, which contains a paper card, with the 32 points of the Compass fixed on a magnetic needle, which always turns to the North, excepting a small declination, variable at different places; which, however, being capable of estimation, the Compass enables the Mariner, when out of sight of any Landmark, to steer his course across the pathless Ocean.

(z) The points of the Compass may be thus enumerated, North—N. by E.—N. N. E.—N. E. by N.—N. E.—N. E. by E.—E. N. E.—E. by N.—East—E. by S.—E. S. E.—S. E. by E.—S. E.—S. E. by S.—S. S. E.—S. by E.—South—S. by W.—S. S. W.—S. W. by S.—S. W.—S. W. by W.—W. S. W.—W. by S.—West—W. by N.—W. N. W.—N. W. by W.—N. W.—N. W. by N.—N. N. W.—N. by W.

CHAP. II. §22. Now the distance that any of the Heavenly bodies either rises from the East or sets from the West points of the Horizon, is called by Astronomers, its Amplitude. The pupil will easily perceive, that the *quantity* of this Amplitude must always depend upon the elevation of the Pole above the Horizon; in other words, there is a constant proportion between the latitude of a place, and the distance which any of the heavenly bodies rises or sets from those two points: So that if we know the one we may determine the other. To convince himself of this, let him elevate the Pole to the height of 40° above the Horizon, and bringing the Star *Arcturus* down to the East side of the wooden circle, he will find that it rises in that latitude 27° to the North of East: but, if he lift up the pole 10° higher; that is, if he rectify it to the latitude of 50° , he will see that, on bringing it down to the Horizon, it corresponds with 33° of that circle. This then is another means of discovering the situation of any place with respect to the Equator; and, though seldom used in practice, deserves mentioning here, as it involves in it one of the principles of the sphere, on which many of the problems on the Globe depend.

CHAP. III.

On Longitude, and the methods of discovering it by Observation.

§1. ONE very striking consequence of the figure of the Earth and its daily motion; and which may serve to illustrate this part of Geography, is, that *if a man go round the Earth Eastward he will reckon one day more* to have passed during the time of his voyage, than they do who live at the place from whence he set out; and be one day forwarder in the week than they are at his return thither; so that he will count their Monday to be Tuesday; their Tuesday to be Wednesday, &c. On the other hand, if he sail round the Earth Westward, he will, on his return, count one day less to have passed than they do who have continued all the while at the place from whence he began his voyage; and be one day in the week later than they; so that it will be Tuesday with him, when it is Wednesday with them, &c. The reason of this will be easily seen by referring to the globe: suppose a man were to begin his tour from London, and to travel Eastward; when he is got to the Meridian of Naples, which is 15° from that of London, it will be noon with him *one hour* sooner than with those who live at London: when he arrives under the Meridian of Cairo 30° E. from that of London; he will have noon *two hours* sooner than they at the place from whence he set out: and so on in the same proportion every Meridian he arrives at, 15° further East from London, it will be noon with him an additional hour sooner than at that city. And when he has gone quite round, and is returned to London again, he will have gone 360° East from the Meridian of London; and it will be noon 24 hours, or a whole day sooner with him than with those who staid at London. The consequence of travelling Westward round the Globe will be obvious to the pupil, if he have understood what has been said thus far.

§2. The Longitude of a place, as has been before observed, is the distance of its Meridian from some certain Meridian adopted by Geographers as the first; and is reckoned in degrees of the Equator. Now as the earth turns round upon its axis, once in every 24 hours; and as this motion is equally rapid during every moment of time; it is evident that 15 degrees of the Equator must pass under any given celestial Meridian in one hour of time. To illustrate this, let the brazen Meridian be considered as the representative of a celestial Meridian, or a circle drawn through the two points in the Heavens, which are opposite to the Poles of the Earth, and any given Star. Let the pupil then turn the Globe upon its axis, and, by looking at the Index, (a) he will perceive that one hour, or a twenty

(a) The index is a small brass finger which is fixed, in modern Globes, under the Meridian to move freely round the extremity of the wire which represents the axis; but, is so contrived as to remain still when the Globe is in motion.

fourth part of the whole circle of hours (*b*) passes under the Index, which remains fixed, while 15° of the Equator passes under the brazen circle: And, in the same proportion, for the smaller divisions of an hour; that is, a space of the hour circle equal to 4 minutes is pointed out by the Index, whilst a single degree of the Equator passes the Meridian.

§3. Thus it is plain, that the *difference of Longitude* between any two places, and the *difference of time* at those two places have a constant and invariable reference to each other. That is, if we know the Longitude of any place, and can discover how much *later* or *earlier* the Sun comes to the Meridian of any other place whose Longitude we wish to ascertain; we have only to allow one degree for every 4 minutes of that difference of time, and we shall have the Longitude of the *latter* place, and for the minuter portions of time, in the same proportion. Or, if we know the Longitudes of any two places, and wish to know how much the one has noon, or any other hour of the day, *earlier* or *later* than the other; their difference of Longitude (*c*) may be turned into difference of time, by allowing 4 minutes of the latter, for every degree of the former.

§4. But how is it possible to discover the difference of time between any two places? Because, if this can be done, their distance on the Globe may be as accurately ascertained, as if it were actually measured on the surface of the earth itself? And here we have the same reason to admire the wisdom and goodness of the divine being, as we had in contemplating the means with which he has furnished us, of determining our distance from the Equator and the Poles. In this, as in the former instance, we derive our knowledge from the grand fabric above us: And thus our *interest*, as well as our *curiosity*, impels us to turn our attention to a survey of that stupendous and magnificent system, which so energetically proves the *existence*, and calls to the *worship* of the *deity*.

§5. All the appearances that take place, in consequence of the motions of the planets, take place at the same moment of time; and consequently, all, to whom those appearances are visible, can, if they have an opportunity of comparing how long, after the passage of the Sun over their respective Meridians; that is, how long after each of their Noons, the appearance happened, will be able to tell, how many degrees they are to the East or West of each other. An eclipse of the Moon is one of those remarkable phenomena, or appearances, which happen at the same moment of what has been called *absolute time* to all to whom they are visible: so that if any two observers, in places remote from each other, were to notice with accuracy the number of hours, minutes, and seconds, an eclipse took place after the Sun had passed the Meridian; that is, if they were to set down the time pointed out by a well regulated watch, at which it happened, they would be enabled to tell their difference of Longitude. Thus, suppose my correspondent, in a distant part of the world, were to write me word, that he observed the beginning, or the ending of an eclipse of the Moon, to be at 9 o'clock in the evening; and I find, by consulting the memorandum I had made of the time past noon when I observed the same appearance, that it was 11 at night by my watch; I should immediately conclude that the distance of our Meridians, or our difference of Longitude, was 30°, that being the number corresponding with 2 hours of difference in time, and I should know that I lived so many degrees to the Eastward of my friend, because it happened at a *later* hour to *me* than to *him*.

§6. Besides the eclipses of the Moon, Astronomers avail themselves of other *instantaneous appearances*, which take place among the heavenly bodies. It has been said, in Chapter II, that the Satellites of Jupiter are, like our Moon, subject to be eclipsed: And, as these eclipses happen at stated and regular intervals, Astronomers are enabled to calculate the precise hour, minute, and second, when they will occur; and these calculations are collected into an Almanac, and published yearly, so that,

(*b*) The reason of this name will appear obvious to the pupil, by barely consulting the Globe.

(*c*) The same rules are to be observed in finding the difference of longitude as the difference of latitude; that is, if the one be in E. longitude and the other in W. longitude, they must be added; but if they be both of the same name, it is necessary to subtract them.

CHAP. III. by the help of these, an observer in any other place than that for which the calculations are made, may determine his longitude, by attending to the difference of time between their appearance to him, and that predicted in the Almanac. This method of discovering the longitude answers very well on shore; but the observation requires such accuracy as is almost impossible to be obtained at sea, on account of the motion of the vessel. The time at which the Moon, in her monthly progress round the Earth, appears to pass certain fixed Stars, is likewise capable of being predicted, in consequence of the regularity of her motion; and, being set down in Almanacs, furnishes the means of ascertaining the difference of time, and consequently the difference of longitude, between the place for which the calculation is made, and the place where an observation is taken. There is at Greenwich, a capital observatory; where persons are constantly employed in watching the motions of the heavenly bodies, and from their observations, joined to those of Astronomers in other parts of this kingdom, and other countries, the theory of the celestial motions has been so well established, that the Almanac which is published under the inspection of the Board of Longitude, furnishes Mariners with the proper materials for ascertaining the longitude at Sea, with considerable accuracy. This Almanac is called the Nautical Ephemeris.

§7. After what has been said, it may, perhaps, be barely necessary to hint, that voyagers, or travellers, may know their longitude by means of a truly going Watch. For, if upon setting out from any port, I regulate my Watch to the time at that place; that is, if I place the hour and minute fingers at 12, when the Sun is on the Meridian; my Watch, if it go regularly, will always shew me the time it is at the place I left; and, by ascertaining the time in any part of my voyage, the difference of that time and the time shewn by my Watch, being turned into degrees, minutes, &c. according to the method shewn in (§3.) will give me the difference of longitude between the place from whence I came, and that at which I am arrived.

C H A P. IV.

On the Vicissitudes of the Seasons, and the origin of those Circles of the Globe, which depend thereupon.

§1. IT is hoped that the pupil will, by this time, have become acquainted with the principles upon which the necessary observations for the discovery of the latitude and longitude of places upon the Earth are founded: and it may be proper now to proceed to inform him, in what manner the inhabitants of different parts of it are affected, by the distribution of light and heat; and the circumstances which are caused by variety of situation with respect to the Equator.

§2. And here the most striking difference is that of *Climate*. He has undoubtedly heard of the division of the Earth's surface into *Zones*; the *Torrid*, the *Temperate*, and the *Frigid*. These spaces are distinguished on the artificial Globe, by circles drawn parallel to the Equator. The two *Tropics*, as they are called, he will find described at the distance of $23\frac{1}{2}$ degrees on each side of the Equator; that to the North distinguished by the name of the *Tropic of Cancer*, and that to the South the *Tropic of Capricorn*: The reasons for this distinction he will understand from what follows; at present it will be sufficient for him to know that the Sun is never vertical, or over-head to the Inhabitants of any other part of the Earth but that broad tract which is circumscribed by these two circles: and the most familiar method of shewing how this arises from the manner in which the Earth moves round the Sun, will be for him to elevate the pole of the Globe in such a manner, as to make the Equator and the Horizon coincide; and having drawn a circle of about 4 yards in diameter, upon the floor with a piece of chalk, to represent the orbit of the Earth, or its path round the Sun, let him place a Candle in the centre of it, and at such a height as that its light shall just shine along the plane of the Horizon, and fall

upon the Equator, the Candle will then serve as an imaginary Sun. Let him now move the Globe CHAP. IV. with one hand round the Candle, and along the circle which he has drawn on the floor; and, with the other hand, turn the Globe upon its axis; he will distinctly perceive that in every part of its orbit, and at every moment of its rotation round its axis, the Candle is constantly *over the Equator*; so that if the Earth be imagined to move round the Sun, with its axis exactly perpendicular to its orbit, as that of the artificial Globe is, with respect to the floor; the consequence would be, that none but those who live under the Equator, would ever have the Sun over-head: the contrary to which, as was observed in the beginning of this section is the fact; and therefore we must seek for some other solution.

§3. Let him next then depress the pole of the Globe $23\frac{1}{2}$ degrees towards the North part of the Wooden Horizon; that is, till $23\frac{1}{2}$ degrees of the Meridian from the Equator towards the North pole, lie *under* the Wooden Horizon. The axis of the Globe may then be said to make an angle with the plane of its orbit of $66\frac{1}{2}$ degrees (the plane of the Wooden Horizon, in this case, being the same with the plane of that imaginary circle, which the center of the Globe describes in going round the imaginary Sun; and $66\frac{1}{2}$ degrees of the Meridian lying between the Horizon and the Pole).

§4. But this position of the axis of the Globe, with respect to its orbit, will not alone account for the variety of Seasons; regard must be had to the manner in which it is carried round the Candle. Let 2 lines therefore be drawn through the centre of the circle, representing the orbit of the Earth, crossing each other at right angles, or exactly perpendicular to one another, and let the opposite ends of one of them be marked N. and S. and of the other W. and E. to represent the four Cardinal points, taking care that, when looking towards the North point, the W. be marked at the left hand end of the line which crosses the N. and S. line, and the E. at the other, upon the principle which was mentioned in § 1. Chap. II. Let the Globe be now placed in that part of the circle marked N. and in such a manner, that the brass Meridian shall have exactly the same direction as the N. and S. diameter of the circle has: let the Globe be then turned upon its axis, and it will be found, that the Candle, or imaginary Sun, will be vertical to that part of the Globe which is marked by the Tropic of Capricorn; that is, that all those persons who live $23\frac{1}{2}$ degrees to the South of the Equator, will have the Sun over-head, whenever the Earth is in a similar position, with respect to the Sun, as the artificial Globe is now in, with respect to the Candle. It may be remarked too, that as the Sun can only enlighten one half of the Earth at a time; in other words that no place more than 90° from that to which he is vertical at any moment of time, can enjoy his light; it is evident, that the regions about the North Pole must be in total darkness at this time; and, *that*, to the extent of $23\frac{1}{2}$ degrees from that point on the Earth's surface: For, as the Sun is now vertical only to those places which lie $23\frac{1}{2}$ *beyond* the Equator *from* the North Pole, it is clear, that his light which, when vertical to the Equator, extended *as far as* the Pole *only* (that point being 90° from the Equator) it must now fall $23\frac{1}{2}$ *short* of the Pole; and therefore, whatever number of rotations the Earth may make upon its axis, whilst its axis has the present inclination, and is thus turned from the Sun, all that space, which lies within $23\frac{1}{2}$ of the Pole, must necessarily remain in darkness(x). And in this manner it is, that the long Winter which prevails in the Polar regions is satisfactorily accounted for. But it may probably occur to the pupil, without his having it suggested to him, that the light which is thus *lost* to the Inhabitants of the *Northern* Polar tract, must be *gained* by those in the neighbourhood of the *opposite* Pole. That as the one are turned *from* the Sun, the other must unavoidably be turned *towards* that luminary. This is exactly the true

(x) The pupil will now perceive the origin of those dotted circles, which are described on the Globe, at the distance of $23\frac{1}{2}$ degrees from each Pole, and which are thence called the *Polar Circles*; that round the North Pole the *Arctic*, and the other the *Antarctic*. He will now, likewise, have arrived at a knowledge of the reason for the distribution of the Earth into Zones; and will see, why the spaces circumscribed by the *Polar Circles* are called the *Frigid or cold Zones*, and why the term *Torrid*, or *Hot* is applied to the space between the *Tropics*: The application of *Temperate*, to the two remaining tracts; namely, to that between the *Arctic Circle*, and the *Tropic of Cancer*, and that between the *Antarctic Circle*, and the *Tropic of Capricorn*, will appear not less obvious. Most modern Globes have a moveable brass semicircle attached to the East and West points of the Wooden Horizon, which may be used to shew the boundary of light and darkness in the above experiment, by bringing it to lie over the Polar Circle.

CHAP. IV. state of the case, and he will find, by turning the Globe upon its axis, that, as its rotation, in this part of its orbit, can never bring the one within sight of the Sun; so *that motion* can never carry the other out of the view of him. Thus, if the Earth were always to retain its present situation, the one would have perpetual Day, the other eternal Night(*a*). This experiment then shews the cause of Winter to the Inhabitants of the Northern, and Summer to those of the Southern Hemisphere: for it certainly need not be remarked that as, generally speaking(*b*) it is hottest when the Sun is vertical; so, in proportion as any place is nearer, or more remote from those places where he is vertical, they must be subject to a greater or less degree of heat.

§5. If the Globe be removed to the opposite part of the Circle or that marked S. and with its North Pole directed the same way as before; that is, with its brass Meridian exactly in a line with the Diameter marked N. S. the pupil will find, that the case is quite reversed: That the light of the Candle, when the Globe is turned upon its axis, falls directly upon that part of it which is marked by the Tropic of Cancer: That the regions about the *North Pole* have now perpetual light, and that those in the neighbourhood of the *South Pole* are never brought by the rotation of the Globe within view of the Candle: That the inhabitants of the *Northern Hemisphere* must now have *Summer*, and that it must be *Winter* with those who live to the *South* of the Equator. It may not be amiss for him to repeat the experiment, in the opposite part of the orbit, fixing upon some particular place, Great Britain for instance, and remarking how much nearer we, in this Island, are to the place where the Sun is vertical, in our Summer than in Winter.

§6. By carrying the Globe to either of the remaining points of the chalk Circle, the pupil may explain to himself how it happens, that on two Days of the Year, there is equal Day and Night in every part of the World. For, placing the Globe with the same precautions as before; that is, with the brass Meridian exactly in the same direction as the N. and S. line, or at right angles to that marked E. and W. he may conceive of the Meridian as the *terminator* of light and darkness; observing that, as long as any place remains on that side of the brass Circle *opposite* to the Candle, it must have Night; and that the duration of its Day will be represented by the time it continues on the side *towards* the Candle. And these times, considering the motion of the Earth on its axis to be always equal, he will conceive to be exactly of the same length to every part of the surface of the Globe. It will also appear plain to him, that the Sun is vertical to the Inhabitants under the Equator at these seasons of the Year; for, on turning the Globe round, every part of that Circle is successively brought exactly opposite to the Candle(*c*)

§7. By this familiar method it is hoped that the phenomena of the seasons may be illustrated. It is on the 21st of December, that the Earth is in that part of its orbit denoted in the chalk Circle by N. when our Winter quarter begins. Her situation on the 21st of June is that marked by S. when our Summer quarter is said to commence. The stations E. and W. are those of the beginning of the Spring and Autumnal quarters, which happen on the 20th of March, and 23d of September. Her place in the intermediate parts of her orbit, and the times of the year corresponding to them, may be generally conceived of by imagining her to perform a *third part* of each quarter, in the course of a month,

(a) This is not strictly true as they would still enjoy a twilight.

(b) It is necessary to make this remark; for, *local circumstances* have such an influence upon the degree of heat and cold, which prevail at different places, that they are by no means uniformly governed by the quantity of Latitude. They have much severer Winters, on the Eastern Coasts of North America, than are found, at equal distances from the Equator, on the Western shores of Europe.

(c) In all these experiments it is to be remembered, that the Candle is supposed to have remained exactly of the same height with the top of the Horizon of the Globe; and the place, to which it has been considered as vertical has been *that* which would have been marked on the surface of the Globe, by a right line passing from the centre of the blaze to the centre of the Globe.

proceeding from her first station N. on the 21st December towards E. and from thence through S. to W. and so on again to N. in the course of 12 months. But the difference in the lengths of the days, at those intermediate times, in the different parts of the world, will be better explained by the following experiment.

§8. On modern Globes there is usually a scale of declination placed (1), commonly called the Analemma; by means of which the Sun's distance from the Equator, may be found, for any day in the year. The pupil will see, that it extends quite across the Torrid Zone, from one Tropic to the other: that the days which lie over the Equator are the 20th of March, and the 23d of September; and that those corresponding with the Tropics are our longest and shortest days; he will easily discover which way to count the days of the Month, and a little practice will enable him to make use of this appendage to the Terrestrial Globe with great facility. For, by bringing the middle of it to lie exactly under the graduated side of the Meridian, the declination of the Sun, for any given day, is the degree above it on the brass circle. Thus he will find that on the 15th of April, the Sun's declination is 10 degrees North: on the 21st of November, 20 degrees South, &c. And, by turning the Globe upon its axis, and observing what places pass under it; he will discover what places have the Sun vertical, or over-head, on any given day. Thus he will find, that on the 18th of May, or the 15th of July (2) the Sun is vertical to the N. part of Owhyhee, the city of Mexico, Campechy, Cape Mayzi, in the Island of Cuba, and all other places which have 20° of North latitude. The converse of this problem is, having a place given, to tell on what days of the year the Sun is vertical to it, which is done by bringing the place under the Meridian, and observing which is the degree which stands above it, then turning the Globe round, 'till the middle of the Analemma lies under the Meridian, the days of the month, corresponding with the latitude of the given place, will be the *solution to the problem*.

§9. As the Analemma then furnishes us with an easy method of knowing the Sun's declination for any given day; we may now proceed to make use of the Globe, in illustrating the difference in the lengths of the days, at different seasons of the year, and in different parts of the world. And, in the first place, the pupil must keep in mind, that the place of the Sun is, in this problem, always supposed to be that point in the brass Meridian, which stands immediately above the day of the month for which we are working. Thus, on the 27th of August, the Sun is supposed to be exactly on the 10th degree of the Meridian, South of the Equator; and so for any other day of the year. The pupil must next be reminded that the Sun cannot enlighten more than one half of the Earth at a time; and consequently, that we may make use of the Wooden Horizon as a *terminator or boundary of light and darkness*, as was shewn in (§2). Suppose, for instance, that I wished to tell the time of the Sun's rising and setting, or in other words the length of the day, at London, on the 27th of April; by consulting the Analemma, I find, that the Sun, on that Day, is about 14 degrees North of the Equator; and, consequently, that his light must extend 14° beyond the N. Pole. Having raised that Pole so many degrees above the Horizon, I consider, that if the Sun be imagined to be placed on the brass Meridian, it must be noon at London, and indeed at all other places, when they come under that circle; for, then only will they have the Sun exactly N. or S. of them (Chap. II. § 6.): And, as the rest of the hours of the day are regulated by the time of noon, I can make use of the hour circle as a clock, by bringing London under the Meridian, and placing the index, or brass finger, at 12. Then, as the motion of the Earth is from W. to E. if I wish to know the time of the Sun's setting, I bring London to the E. part of the Horizon, which is now used as a terminator; and I find that the finger points to a quarter after 7; so that the day must have been 14½ hours long. In the same manner the length of that day, at any other place, may be known by bringing the place under the Meridian; placing the index at 12,

(1) On Wright's Globes (which are now most commonly in use) the middle of this Analemma crosses the Equator at the 120th degree of West longitude.

(2) I hope it is not necessary to remind the pupil, that the Sun is vertical on *two* days of the year to all places in the Torrid Zone.

CHAP. IV. afterwards bringing it to the East side of the Horizon, and doubling the number of hours pointed out thereby; since the time from noon to Sun-set, is the same as that from Sun-rise to noon.

§10. Thus, the comparative length of the day, at different times of the year, and in different places, may be familiarly illustrated; as well as the length of the night, which is always what the length of the day wants of 24 hours: that is, if the day be 16 hours long, the night must be 8—if 13 hours the night must be 11, &c. From hence it appears, that though there is a great inequality in the time of the Sun's continuance above and below the Horizon, in proportion to the distance which any place lies from the Equator; yet, taking the whole time of day-light throughout the year, at any two places, it will be found that there is an equal distribution of it all over the Earth. The length of the longest day at London is $16\frac{1}{2}$ hours, but on the shortest day the Sun only continues $7\frac{1}{2}$ hours above the Horizon. At the Equator the Sun always rises at 6 and sets at 6 making every day throughout the year exactly 12 hours long. The general rule for working this problem for any other day, or any other place, than that in the example above is, to elevate or depress the Pole equal to the declination of the Sun, according as it is North or South, and having brought the given place to the Meridian, set the index to 12, and afterwards bring the place to the West side of the Horizon, for the time of the Sun's rising, or to the East for its setting(6).

CHAP. V.

On the Ecliptic and Zodiac.

CHAP. V. §1. THE circle which is described on both the Globes, crossing the Equator in two opposite points, and extending each way as far as the Tropics, is called the Ecliptic. Its origin, as an appendage to the Terrestrial Globe, may be conceived of in this way. Let the pupil set the Globe in that position in which it was used when illustrating the phenomena of the Seasons, Chap. iv. It was there observed, that the Horizon was in the same plane with the orbit which the centre of the Globe might be imagined to describe, when carried round the Candle; or in other words, if the Horizon were imagined to expand itself to the breadth of the chalk Circle, keeping every where at the same distance from the floor, it would represent the path of the Earth round the Sun. The Ecliptic then is a Circle which has the same inclination to the Equator, or the same direction with respect to it, as the Horizon, when representing the orbit of the Earth has to that Circle. The pupil may convince himself of this, by elevating the Pole $66\frac{1}{4}$ degrees, and bringing that point of the Ecliptic, which is farthest North of the Equator, to the North part of the Horizon. He will then see, that the Ecliptic and the Horizon coincide: so that, in constructing a pair of Globes for himself, he might draw that circle, crossing the Equator in any two points he pleased(20).

(6) The common method of performing this problem, is by elevating the pole to the latitude of the place, bringing the Sun's place in the Ecliptic for the day of the month to the Meridian, setting the index to 12, and observing what the hour of his rising is as shewn by the index when that point of the Ecliptic is brought to the East side of the Horizon. But I have thought that the above method is more purely *Geographical*, as it shews at one view the comparative lengths of the day.

(20) I confess I have an objection against the introduction of this circle, either upon the Terrestrial Globe or a Map of the World; as, I think, all problems, respecting the rising and setting of the Sun, &c. ought to be conducted, upon the Terrestrial Globe, on the principle set down in this Chapter. On this account the pupil will find, that I have entirely omitted it, in my Map of the World. The only thing which can be urged in favour of its insertion on both Globes, is that it is useful when a person happens to be furnished with only one of them.

§2. But the origin of the Ecliptic, in reference to the Celestial Globe, requires a different explanation. It there represents the *apparent path* of the Sun amongst the fixed Stars (Chap. ii. §16.)—But the pupil may be ready to ask, “How can this be known, since we never see the Stars at the same time with the Sun?”—‘The Moon’s path through the Heavens,’ he will say, ‘may be marked on the Globe, by observing what Stars she passes in her monthly journey; because they and she are visible at the same time: but, the superior light of the Sun effectually prevents us from observing what Stars are in his neighbourhood at any time.’ (22)

§3. But this difficulty will vanish, when he considers, that if we can determine which is the *opposite* point of the sphere of the Heavens to that in which the Sun is found at the noon of any day, we can assign him his proper place amongst the fixed Stars. Suppose, for instance, that on the 15th of February, being in lat. $52\frac{1}{2}$ degrees North, I observed the Sun’s altitude at noon (Chap. ii. §14.) to be 25° , his distance from my Zenith must be 60° South, but the Equator is only $52\frac{1}{2}$ South of my Zenith; consequently the Sun must be $12\frac{1}{2}^{\circ}$ to the South of the Equator on that day; and the point in the Heavens exactly opposite to him, must be as many degrees to the North of the Equator (23). If therefore, I observe what point of the Heavens comes to the Meridian at twelve o’clock at night, having $12\frac{1}{2}^{\circ}$ of North declination, I conclude *that* to be the point exactly opposite to the place of the Sun, on the noon of the day of observation, which in the present case happens to be the Star *Cor Leonis*, in the constellation of the Lion: The opposite point to which is easily found by holding that Star under the brass Meridian, and counting as many degrees South of the Equator, on the opposite half of the Meridian; or placing the index at 12, while the Star is under the Meridian, and turning the Globe round ’till it point to the opposite 12, the Sun’s place will lie under $12\frac{1}{2}$ degrees of South declination. These two points, then being brought to coincide with the Horizon, a circle may be drawn to represent *the apparent path of the Sun amongst the fixed Stars*: for any two points in a circle, on the surface of the Globe, being given, the whole of the circle may be determined, as will appear obvious on the slightest reflection. This then is the origin of that circle which is called the Ecliptic: and by these means the pupil might draw that circle upon any Globe which was not supplied with it.

§4. But on the celestial Globe there are parallels of latitude drawn through every *single degree*, to the distance of eight degrees, on each side of it; and these are crossed again by portions of Meridians to every single degree of longitude. This broad space is called the Zodiac. Its use is to enable us to point out the places of the Moon and Planets with greater accuracy; for they are never any of them found to deviate farther from the Ecliptic than eight degrees: but are always discovered in the neighbourhood of some of those fixed Stars, which are included within the Zodiac.

§5. The distance of any of the heavenly bodies from the Ecliptic is called its latitude, and the number of degrees which it has from one of those points of the Ecliptic which crosses the Equator, is called its longitude. Declination means the same thing on both Globes; that is distance from the Equator. The pupil will, no doubt, thus have discovered, that the numeration of the degrees of the Equator, are carried on from two different points; those on the lower part commencing at the Meridian of London, and those on the upper at that part of the Equator which is crossed by the Ecliptic. The former he knows to be useful in counting the longitude of places: the destination of the latter he

(22) The Stars are visible in the day-time, at the bottom of deep Coal-pits; where the small portion of light, admitted at the narrow aperture which forms the entrance, does not prevent an observer from seeing distinctly all the Stars which pass over his head. We are told that an ancient Astronomer caused a high tower to be erected over the mouth of a deep Well, from the bottom of which he used to make his observations on the Stars which passed his Zenith.

(23) This will appear plain to the pupil if he draws a circle to represent the Meridian, cross it with a diameter for the Equator, and make a point in the circumference, at the distance of $12\frac{1}{2}$ degrees, *below* this diameter, to represent the place of the Sun; since its declination is South (and in drawing all diagrams of this kind the top of the paper is considered as the North, the bottom South, the right hand side East, and the other the West). A ruler laid over this point, and the centre of the circle, will cut the circumference in a point $12\frac{1}{2}^{\circ}$ *above*, or to the North of the line representing the Equator.

CHAP. V. is yet unacquainted with : but, by applying to the celestial Globe, he will find that the Equator *there* is numbered singly, and that the degrees on it are counted like those on the upper part of the *Terrestrial* Equator. From the oblique position of the Ecliptic, with respect to the Equator, it was necessary that some other mode of determining the situation of any point on the surface of the celestial Globe, should be adopted than that of latitude and longitude (as they are defined in the beginning of this section) and none could be better, than that of giving the declination, and the distance from a certain point of the Equator, which might be equivalent to the latitude and longitude of a place upon the Earth. But as the term longitude was already appropriated to distances estimated on the Ecliptic, the term *right ascension* is used to signify the number of degrees, which any point, on the surface of the celestial Globe, lies from that point of the Equator which is crossed by the Ecliptic, and is counted quite round the Globe. Thus by having the right ascension and declination of any fixed Star, we may find it on the celestial Globe in the same manner as places are found on the terrestrial Globe, by knowing their latitude and longitude. The right ascension and declination of the principal fixed Stars are to be found in Wright's Ephemeris page 46.

§6. I hope that the pupil will by this time perceive, that by the help of the Quadrant, described in (§15. of Chap. ii.) he might himself be enabled to delineate on the surface of a blank Globe, without copying from another, the relative situation of all the fixed Stars, which are visible in the course of the year in the latitude where he makes his observations. The method of finding the height of the Pole, and consequently the height of the Equator, has been already described. Having previously drawn a Meridian line with care, and suspended over it two horse hairs, kept in a perpendicular position, by means of small weights; and hanging so, that at noon the shadow of the one shall fall exactly upon that of the other: the moment when any Star appears exactly in a line with both the hairs, it is in the Meridian; and its altitude taken at that time will give its distance from the Equator: for if it be South of the Zenith at the time of observation, and the observer be in North latitude, the difference between its altitude and the altitude of the Equator (which is always the complement of the latitude or what it wants of 90°) will be its distance from the Equator or its declination.

§7. If then, some particular Star be fixed upon, from whence the right ascension of others may be counted (in the same manner as the Meridian of London was adopted as the commencement of longitude on the Earth) the places of the rest of the Stars may be laid down. For, *the difference of the times in which they come to the Meridian, will give the difference of their right ascension* in the same manner as the difference of the time of noon, at different places on the surface of the Earth, furnishes us with a knowledge of their difference of longitude.

N. B. No notice is taken here of the difference between solar and siderial time; as the explanation would take up more room than can be allowed to the subject in this treatise; and I only pretend to lead the pupil to an idea of the *principles*, without furnishing him with all the materials for great accuracy in the *practical part of Astronomy*.

§8. The circle of right ascension, which passes through the large Star, on the wing of the constellation Pegasus, is that from whence right ascension is counted on modern Globes. Suppose then, that having allotted a point to represent the place of this Star, on a blank Globe, by having taken its altitude and found its declination as above, I find another large Star to come to the Meridian, in 1 hour and 52 minutes afterwards, and with an altitude of $57\frac{1}{2}^\circ$, my latitude being as before, $52\frac{1}{2}^\circ$; I should immediately know its right ascension, and declination; for 1 hour and 52 minutes of time is equal to 28° of motion; and consequently, the Star must be that number of degrees to the Eastward of the one in Pegasus's wing: and its declination is found, by subtracting $37\frac{1}{2}^\circ$ the height of the Equator, from $57\frac{1}{2}^\circ$ the altitude of the Star, which leaves 20° for its quantity of N. declination. In the same manner the right ascension and declination of any other Star, and consequently its place on the Globe, might be found by observation.

§9. The places of the Sun, Moon, and Planets, are set down in a different manner in the Ephemeris. The Ecliptic is imagined to be divided into 12 equal parts, containing 30° degrees, called *signs of the Zodiac*; each of which was in the infancy of Astronomy, distinguished by the name of that constellation which happened to fall under it, but owing to some physical causes, which it is not our present purpose to inquire into, the divisions of the Ecliptic do not now correspond with the constellations from whence they at first derived their names. Thus the sign marked γ (when the Ecliptic crosses the Equator, and which is on that account called one of the Equinoctial Points) was at first designed to denote the beginning of the constellation of *Aries* or the *Ram*: but the pupil will perceive, that the constellation itself is now 30° from that point of the Ecliptic. This hint will be useful to him in making him cautious of being deceived, by taking the *figure* of the constellation instead of the mark made use of to distinguish it, when he is finding the Sun's place. The constellations in the Zodiac, or signs of the Ecliptic, in the order in which they succeed each other, beginning at Aries, are as follow:

γ Aries, or the Ram: τ Taurus, or the Bull: π Gemini, or the Twins: ζ Cancer, or the Crab: α Leo, or the Lion: ν Virgo, or the Virgin: β Libra, or the Scales: σ Scorpio, or the Scorpion: ϕ Sagittarius, or the Archer: ψ Capricornus, or the Goat: ω Aquarius, or the Water-bearer: κ Pisces, or the Fishes.

§10. The Sun's place in the Ecliptic, for any day in the year, may be found, by consulting the calendar, upon the Wooden Horizon, or White's Ephemeris, which ought always to be at hand when the Globes are used. Thus, suppose I wish to know the Sun's place on the 29th of May: opposite to that day, on the Wooden Horizon, I find 8° of the constellation Gemini, which being counted on the Ecliptic, from the beginning of that sign, will give me his place amongst the fixed Stars. The place of the Moon, or any of the Planets, may likewise be marked on the Globe by finding their latitude and longitude as they are set down in the almanack above mentioned, the latter being reckoned on the Ecliptic, and the former counted North or South from thence in the Zodiac. Then having placed small patches on the Globe distinguished by the marks appropriated to each of them, the time of their rising, setting, or coming to the Meridian (which is also called culminating) may be known by the following general rule.

§11. In all problems respecting the time of the rising, setting, &c. of any of the heavenly bodies, it is necessary that the Pole be elevated to a height equal to the latitude of the place of observation. The Sun's place in the Ecliptic must be brought to the Meridian, and the index of the hour circle set to 12. Then the place of the planet, being brought to the East side of the Horizon, the time pointed out by the index, will be the hour of its rising, and being carried successively to the Meridian and West side of the Horizon, the time of its culminating and setting will be seen. Its Meridian altitude may be known, by counting the number of degrees, between its place and the Wooden Horizon, at the time it lies under the brass circle; and its altitude, at any intermediate distance from the Meridian, may be found, by screwing the slip of brass, called the Quadrant of Altitude, over the Zenith point and by laying it over the place of the Planet, the number of degrees between that and the Wooden circle, will be its height above the Horizon, at the time pointed out by the Index.

§12. The pupil is now furnished with such a general idea of the principles upon which the solution of Geographical problems depends; as will, I hope, enable him to understand the nature of such of the *questions for exercise*, annexed to each of the blank Maps, in the following Atlas, as have any reference to the *Astronomical parts of Geography*. I think it unnecessary to add any problems upon the Globes, judging it better to refer the pupil to an excellent collection of them, lately published by the ingenious Mr. Molyneux, of Macclesfield; trusting, at the same time, that the attempt I have here made, to furnish a familiar illustration of the Elements of Geography, will qualify him for using that work or any other on the same subject to greater advantage.

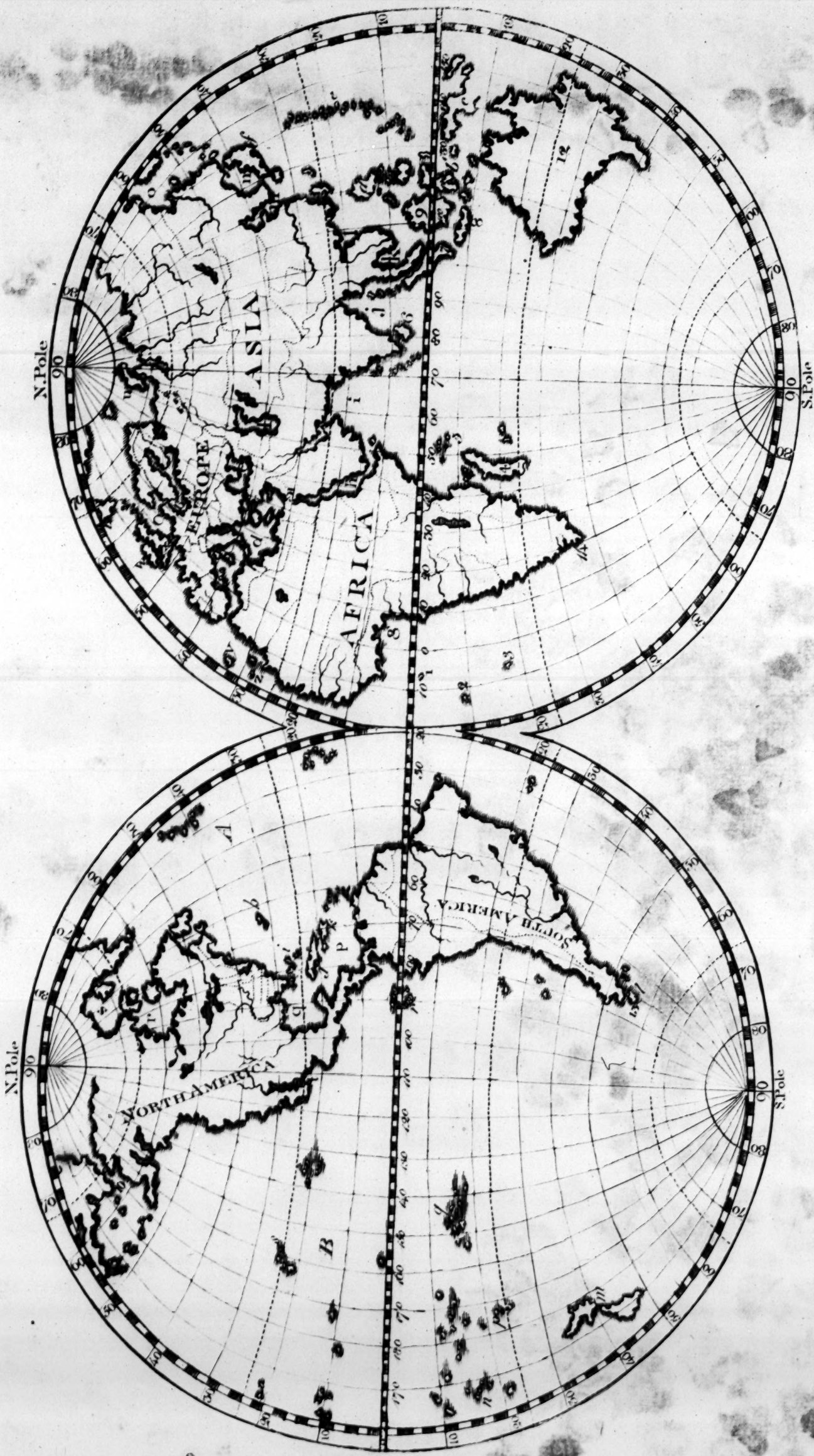
A. P P E N D I X.

N^o. 1. **PAPER** may be cut, so as to cover the surface of a Globe, by taking its length equal to the circumference of the Globe; and having divided that length into 12 equal parts, with a pair of Compasses opened to the extent of 10 of those parts, describe arches passing through each of the divisions, and crossing each other in a point: the Paper cut along the arches thus described, will exactly cover the Globe.

N^o. 2. **GEOMETRICAL DEFINITIONS.**—The *circumference*, or periphery, is that line which is described by one point of a pair of compasses, whilst the other remains fixed in that part called the *centre*. Any portion of the circumference is called an *arch*. A line drawn through the *centre* and extended each way to the *circumference*, is called a *diameter*. That half of a *diameter* which lies between the *centre* and the *periphery*, or *circumference*, is called a *radius*. A line uniting the extremities of any *arch* is called a *chord line*. The whole circumference of every circle is supposed to contain 360° . Two *diameters*, crossing each other at *right angles*, will divide the *circumference* into 4 equal parts, each containing 90° . Any smaller portions of the arch may be measured, by drawing two radii from the centre of the circle, through the ends of the arch, and applying the centre of the instrument called a protractor (which is a semicircle of brass, the edge of which is graduated into 180°) to the centre of the circle: the number of degrees, on the protractor, lying between the two radii, will be the measure of the arch. Or, if from a scale of chords (the line marked Chs. on the plane scale) 60° degrees be taken as *radius*, and the arch of a circle described through the two radii which bound the arch; the distance between the points in which those radii are intersected by this arch, measured on the same line of chords, will give the number of degrees contained in the arch which was to be measured. This may explain what is meant by the measure of an angle. For, in the case before us, the two radii form an angle at the centre of the circle; the measure of which is the number of degrees contained in that portion of the circumference, which lies between them. So that the number of degrees contained in any angle, does not depend upon the length of the two lines which form it, but upon their *direction* with respect to each other. One line is said to be perpendicular to another, when it makes the angles on each side of it equal. The number of degrees which any angle is less than 90° is called the *complement of the angle*; its *supplement* is what it wants of 180° .

GEOGRAPHICAL DEFINITIONS.—The surface of the Earth obtains different names, in consequence of the relation which it bears to the water. Thus land entirely surrounded with water is called an *Island*: that which is nearly so a *Peninsula*, and the narrow track which unites it to the main land an *Isthmus*. When a mountain stretches far into the sea, it is called a *Promontory*, and its extreme point a *Cape*. The term *Continent*, is applied to the largest portions of land, the points of which are not separated by seas. In the same manner, the most extensive collections of water are called *Oceans*; whilst the smaller portions, which are partly enclosed by the land, are called Seas, Bays, or Gulphs; the last two terms are frequently applied, indiscriminately, to those indentations of the shore, the entrance to which is capacious. When the mouth is narrower, and the water penetrates considerably inland, it is called a Sea, and the passage into it a Straight. This latter term is likewise used to denote any tract of Sea, which is inconsiderable in its breadth. **Lakes** are those collections of Water, which are every where surrounded by land.

THE END.



REFERENCES TO THE MAP OF THE WORLD.

THE most general division of the Earth is into four large parts, Europe, Asia, Africa, and America; commonly, but inaccurately, called the four quarters of the World, because they differ materially in extent, as may be seen by a bare inspection of the map. Asia is the largest, and Europe the smallest portion: America is something less than Asia, and Africa more than three times as large as Europe.

This distribution of the land is evidently marked out by nature. America is entirely detached from the other parts of the world, being separated from Europe and Africa by *A.* the Atlantic Ocean, and from Asia by the vast Pacific *B.* making an approach towards it, indeed in the North, where the narrow Strait of Bhering *10.* alone intervenes. Africa is totally disjoined from Europe, and has no connexion with Asia, but by the small tract of land *11.* called the Isthmus of Suez, which is not more than sixty miles over; on every other side it is washed by the sea, and forms an immense peninsula. The line of demarcation between Europe and Asia is less obvious, though the Riphean Mountains, between Siberia and Muscovy, together with the rivers Wolga and Don, in a part of their course, supply a pretty unequivocal boundary. The subdivision of America, into North and South, is naturally suggested by the peculiar shape of the latter, which has the same connexion with the Northern part of the continent that Africa has with Asia: the isthmus which unites them has obtained the name of Darien, or Panama.

Next to these extensive tracts of land, *12.* New Holland claims attention, as it presents a surface not inferior to that of Europe. It is immaterial whether it be called an island or a continent, as it answers the definition of each.

Though the Ocean is, strictly speaking, one undistinguished surface, yet geographers have given different names to its various parts according as they lie with respect to the land. Thus, that part of it which occupies the greater part of the Western Hemisphere, washing the coasts of both Americas, they call the Pacific Ocean, *B.* and that which is interposed between those two continents and Europe and Africa, is denominated the Atlantic, *A.* That part of it too, which washes the coasts of Africa to the South of the Equator, is sometimes distinguished by the name of the Ethiopic Ocean. The Polar Seas take the names of North and South, and that part of the Pacific, which lies between the Eastern coast of Africa and New Holland, is generally called the Indian or Eastern Ocean.

The principal Seas, Bays, Gulphs, &c. formed by the indentations of the land, are as follows.

In the Eastern Hemisphere.

- b. Baltic Sea.
- c. German Sea.
- d. Mediterranean Sea.
- e. Black Sea.
- f. Caspian Sea, which is more properly a large lake, having no communication with any other Sea, even by rivers.)
- g. Bight, or Bay of Benin.
- h. Red Sea.
- i. Arabian Sea.
- j. Bay of Bengal.
- k. Bay of Siam.
- l. Gulph of Tonquin, or Cochin China.
- m. Yellow Sea.
- n. Sea of Corea.
- o. Bay of Kamtschatka.

In the Western Hemisphere.

- p. Caribbean Sea.
- q. Gulph of Mexico.
- r. Hudson's Bay.

- s. Baffin's Bay.
- t. Gulph of California, or Vermillion Sea.

Amongst the numerous islands scattered over the ocean the following may be pointed out on this map.

In the Eastern Hemisphere.

- u. Nova Zembla.
- v. Iceland.
- w. Ireland.
- x. Great Britain.
- y. The Madeiras.
- z. The Canaries.
- 1. St. Matthew.
- 2. Ascension.
- 3. St. Helena.
- 4. Madagafcar.
- 5. The Admiralty Islands.
- 6. Ceylon.
- 7. Sumatra.
- 8. Java.
- 9. Borneo.
- 6. Celebes.

- c. New Guinea.
- d. Luconia.
- e. The Marian, or Ladrone Isles.
- f. Japan.

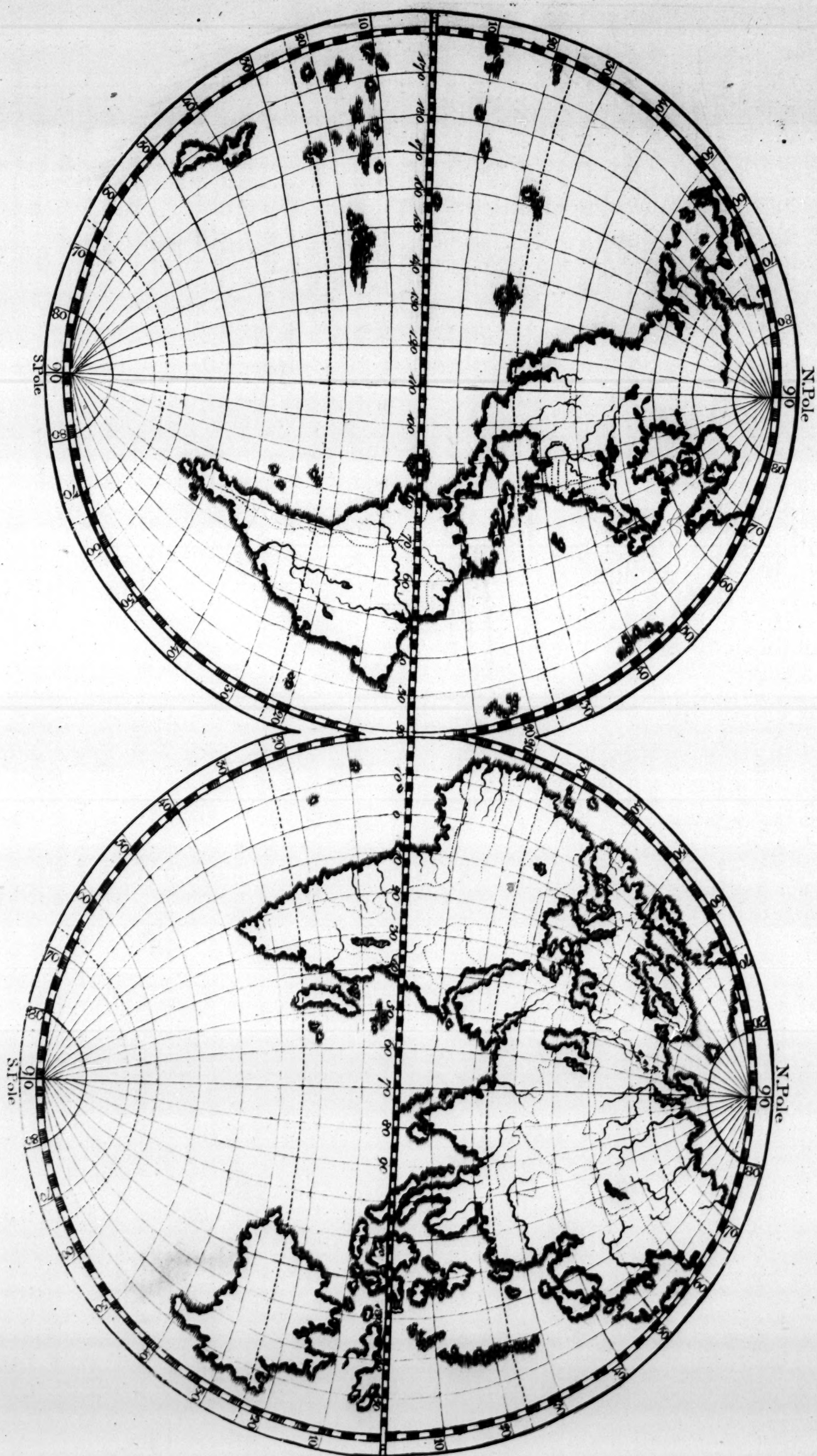
In the Western Hemisphere.

- g. The Azores.
- h. The Bermudas.
- i. The Bahamas.
- j. Cuba.
- k. Hispaniola, &c.
- The last two, together with the chain which stretches from the latter to South America, are called the West India Islands.
- l. Terra del Fuego.
- m. New Zealand.
- n. New Hebrides.
- p. Friendly I's.
- q. Society I's.
- r. Gallapagos.
- s. Sandwich I's.
- 13. Cape Horn.
- 14. Cape of Good Hope.

QUESTIONS FOR EXERCISE ON THE MAP OF THE WORLD.

1. Into how many Zones is the surface of the Globe divided?
2. How many degrees broad is the Torrid Zone?
3. What number of degrees lie between each Pole?
4. By what two parallel circles is the Northern Temperate Zone bounded?
5. How far is it from the Tropic of Capricorn to the Arctic Circle?
6. How many degrees is it from the Equator to each Pole?
7. What do you call that space of the Earth which is included between the Antarctic Circle, and the Tropic of Capricorn?
8. What is the breadth of the two Temperate Zones?
9. What name do Africa and South America obtain in consequence of their shape?
10. Whether does Cape Horn, or the Cape of Good Hope stretch farther Southwards?
11. Where is the Mediterranean Sea?
12. How is the Island of Borneo situated?
13. What do you call those Islands which lie along the Meridian of 140 degrees East Longitude?
14. Where are the Azores, or Western Isles?
15. Do the Sandwich Isles lie in the Northern or Southern Hemisphere?
16. Is the sun ever vertical to any part of Europe?
17. In what Zone does Nova Zembla lie?
18. Do the New Hebrides, or the Society Islands lie most to the Westward?
19. In what part of the World is the Caspian Sea?
20. What is remarkable of that Sea?
21. What is the longitude of the most Westerly part of South America?
22. Whether is there more land in the Northern or Southern Hemisphere?
23. Which of the general divisions of the Earth is the largest?
24. Does Africa exceed Europe in extent?
25. How is America separated from Europe and Africa?
26. Are Asia and America connected?
27. What tract of land is called the Isthmus of Darien, or Panama.
28. What is the longitude of the most Easterly Cape of Africa?
29. How is the boundary between Asia and Europe supplied?
30. How is the island of Sumatra situated with respect to the Equator?
31. Under what limits of North and South Latitude does New Holland lie?
32. What chain of islands is called by the general name of the West Indies?
33. Does the whole of the island of Madagascar lie in the Torrid Zone?
34. One of the islands to the East of Asia is crossed nearly in the middle by the Meridian of 120°, what is its name?
35. What is the breadth of Africa in degrees and English miles, in that part where it is crossed by the Equator?
36. In what part is that continent the broadest?
37. In what direction has it the greatest length?
38. What two large Bays are those in the North of North America?
39. What is the longitude of the Cape of Good Hope?
40. How many degrees of the Equator lie between the Meridian of Cape Horn, and the most Northerly part of the island of Madagascar?
41. In what Ocean does the Island of Ascension lie?
42. What Meridian runs along the most Westerly parts of Europe?
43. What parallel circle crosses New Holland nearly in the middle?
44. The Western end of one of the Asiatic islands lies along the Meridian of 80°, what is its name?
45. When it is noon at London, where is it midnight?
46. What is the difference of Longitude, and difference of time between the most Easterly Cape of Africa and the Western shores of Ireland?
47. What island of North America agrees in Longitude with that part of the Eastern shore of South America which has no latitude?
48. When it is midnight at Cape Horn, it is noon on the Western side of one of the islands of Asia, what is its name?
49. What is the latitude of the most Northerly Cape of Europe?
50. Where are the Bahama islands?
51. How broad is South America in that part where it is crossed by the Equator?
52. When it is 6 o'Clock in the evening at the most Westerly point of North America, what is the hour at the South end of the island of Japan?
53. What is the name of that sea over which the Meridian of 60° East Longitude, and the parallel of 10° North latitude intersect each other?
54. The shores of one of the Asiatic islands have not yet been completely explored, and consequently are left deficient in the Map, what is its name?
55. What sea lies between the island of Great Britain and the continent?
56. The inhabitants of the Western coasts of the Caspian Sea have noon two hours earlier than those of the middle region of one of the islands in the Frigid Zone, what is its name?
57. The parallel of 40° South Latitude passes over the strait which separates two islands in the Southern Ocean, what do you call those islands?
58. Where is the Red Sea?
59. What Bay is that to the Eastward of the Arabian Sea?
60. From what Gulph is it separated by a Peninsula?
61. What shore is washed by the Gulph of Mexico?
62. What do you call that sea which lies between the West India islands and South America?
63. There is a sea formed by the island of Japan, and the continent of Asia, what is its name?
64. Where is the Black Sea?

THE WORLD



EUROPE



QUESTIONS FOR EXERCISE ON THE MAP OF EUROPE.

1. With which of the other general divisions of the earth is Europe connected?
2. Are its boundaries to the Eastward marked out by any particular mountains, or rivers?
3. Are its shores in general more or less irregular than the other quarters of the globe?
4. How is it separated from Africa?
5. In what part does it make the nearest approach to that continent.
6. What is the name of its most Northern promontory?
7. Are its peninsulas numerous?
8. Which is the largest of its general divisions?
9. Does not a sea penetrate a considerable way into this region?
10. Is not the entrance into one of the European seas remarkable for the number of islands which interpose themselves?
11. One of its principal cities lies within a few miles of Asia, what is its name?
12. Name the towns which lie on the Danube?
13. A chain of mountains nearly encompasses one of its divisions, what is the name of those mountains, the country they surround and those territories from which it is separated by them?
14. Two noted rivers take their rise amongst these mountains what are their names and courses?
15. The Meridian of 25° , and the parallel of 35° , intersect each other nearly over the middle of an island, what is its name?
16. What countries of Europe have no sea-coast?
17. On what river does Rome stand?
18. Which is the largest of the European islands?
19. Beginning at Cape North, trace the sea-coast as far as the mouth of the Don, naming the capes as they occur in regular succession?
20. How many of the rivers of France empty themselves into the Bay of Biscay?
21. What is the name of that Gulph at the head of which Tornea stands?
22. What towns have the same longitude as Bergen?
23. Does any part of Europe lie within the Torrid Zone?
24. How much of it lies within the Frigid Zone?
25. The metropolis of one kingdom is situated on an island belonging to it, what are the names of all the three?
26. To what countries does the river Nieper serve as a boundary?
27. Enumerate all the towns in this Map which are situated at the mouths of rivers?
28. What Straits would you have to cross in passing from England into France?
29. Is not one of the European seas remarkable for being crowded with small islands?
30. When it is noon at London, what is the hour at St. Peterburgh?
31. What is the difference of longitude between Lisbon and Koningsburgh?
32. What river passes Paris?
33. How much does the longitude of Wyborg exceed that of Sleswick?
34. What towns stand on the Vistula?
35. Do all the rivers of Spain fall into the Atlantic Ocean?
36. Have not Norway and Sweden a boundary marked out by nature?
37. What is the extreme point of Denmark called?
38. Which countries of Europe are furnished with lakes of the larger kind?
39. Which of the towns of Russia lies nearest the borders of Asia?
40. What clusters of islands are those which lie to the North of Great Britain?
41. Where is Berlin?
42. What island is that the Northern part of which lies along the Arctic circle?
43. How is Upsal situated in respect of Stockholm?
44. Do not the Pyrenees form a natural boundary between two countries?
45. What are the two narrow entrances into the Sea of Marmora?
46. In what direction does Corfica lie from Sardinia?
47. By what strait are they separated?
48. Enumerate the Volcanos of Europe?
49. What are the principal capes in Spain?
50. What is the difference of longitude between the Naze of Norway, and Cape Finisterre?
51. What is the course of the river Po?
52. What towns stand on the river Elbe?
53. Into what sea does the river Oder fall?
54. What is the name of that Bay formed by the indentation of the land in the South of Italy?
55. What Lakes are there in Russia?
56. Where are the Riphean Mountains?
57. There are three passages into the Baltic Sea, what are their names?
58. Which of the countries of Europe have their chief city most centrally situated?
59. What countries lie contiguous to Poland?
60. What do you call the small island which lies to the South of Sicily?
61. Which of the towns of Hungary laid down in this map lies nearest to Vienna?

N:II

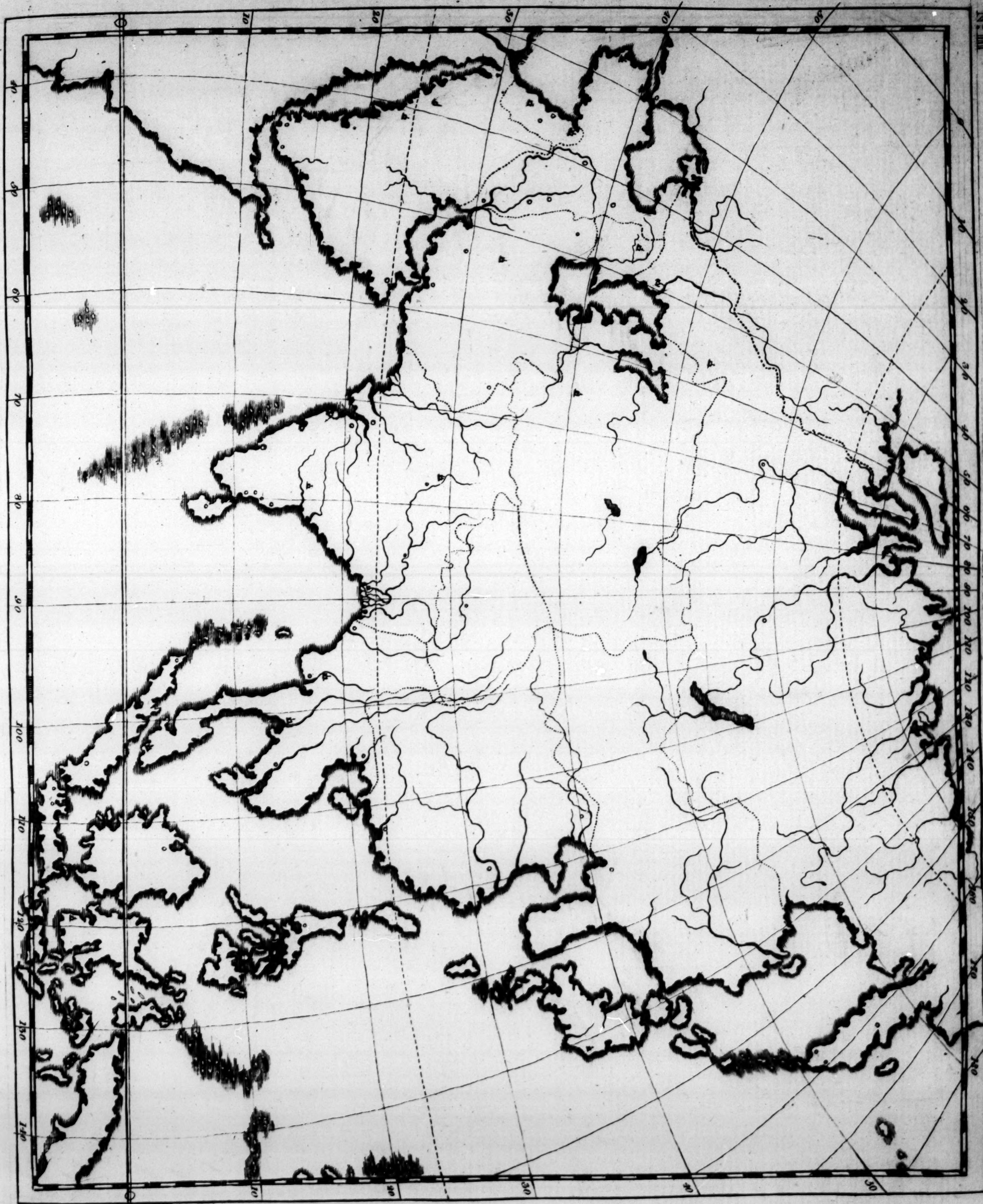
EUROPE



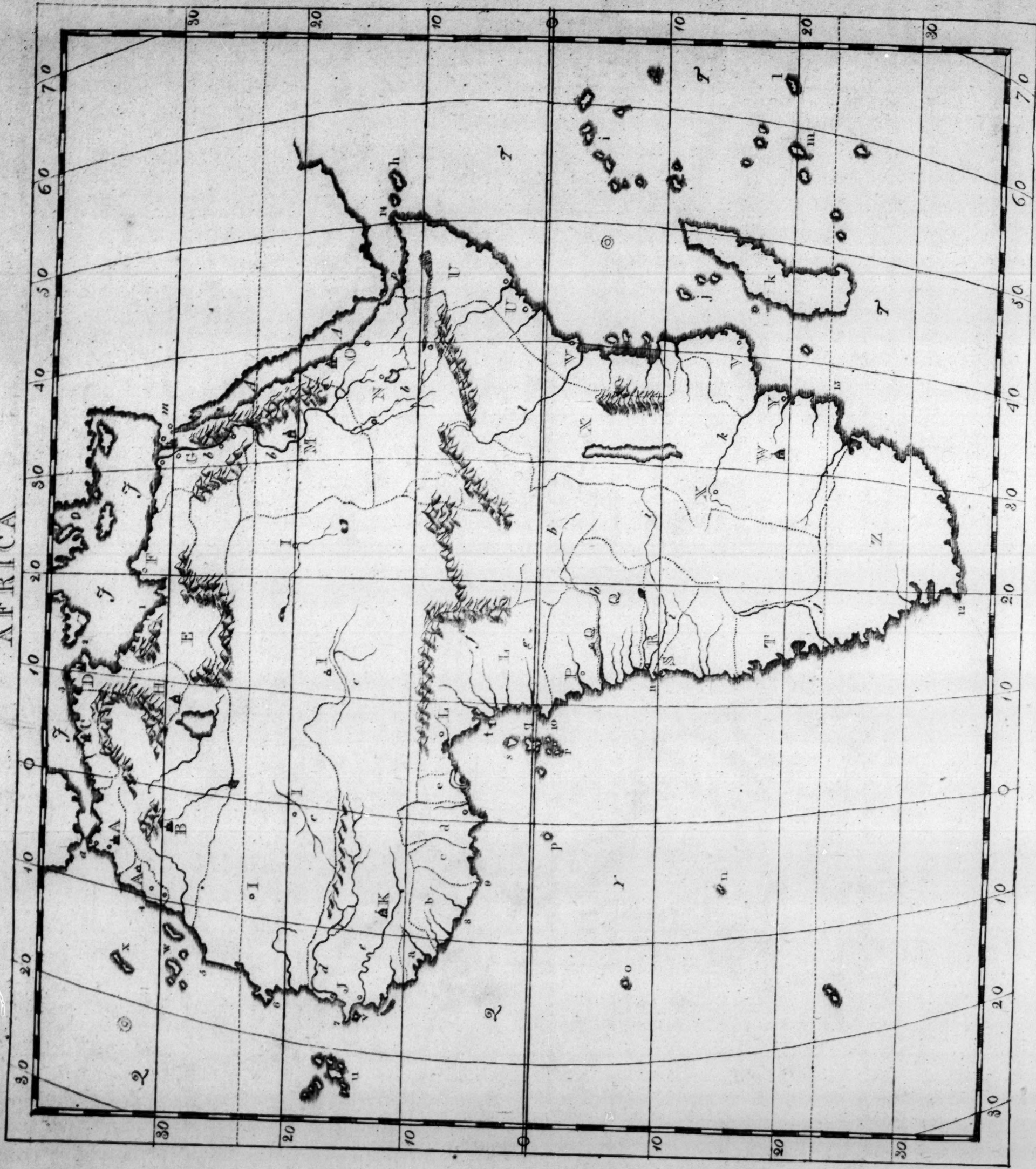


QUESTIONS FOR EXERCISE ON THE MAP OF ASIA.

1. Does any part of the continent of Asia lie within the Southern Hemisphere?
2. Which of its islands are crossed by the Equator?
3. Does not a part of Asia lie in the Torrid Zone?
4. What divisions of it are included in the Torrid Zone?
5. What proportion of the continent lies within the Temperate Zone?
6. Which of its divisions lies nearest to Africa?
7. Which of them borders on Europe?
8. By what countries is the Caspian Sea surrounded?
9. Which are the most remarkable Peninsulas in this map?
10. By what names are the Eastern and Western coasts of Indostan distinguished?
11. What town is that at the mouth of the Wolga?
12. A part of the Mediterranean washes the coasts of Syria and Palestine, how is it denominated?
13. Of what country is Indostan the capital?
14. Among the islands classed with Asia, which is the largest?
15. What principal towns of Asia lie under, or near the Tropic of Cancer?
16. There is a town in Persia nearly in the same latitude with Delhi, what is its name?
17. What are the two most Westerly towns in this map?
18. Which town on the continent, has the least, and which the greatest latitude?
19. In what direction does Damascus lie from Jerusalem?
20. What is the capital of Georgia?
21. On what river does Bagdat stand?
22. Where is Shinyang, or Chynian?
23. What island lies south of Indostan?
24. By what straits are Sumatra and Java separated?
25. Are not there two towns of note near the Straits of Babelmandel?
26. How is the Yellow Sea inclosed?
27. One of the islands of Asia is intersected by the Tropic of Cancer, what is its name?
28. What is the name of the river which passes Lassa?
29. What is the name of that town in Siberia which lies at some distance, northwards, from the Caspian Sea?
30. There are three towns inserted in this map, which differ a little more than 10 degrees in latitude from Delhi and Shiraz, what are their names?
31. Point out a town in India which lies 30° to the Eastward of Afracan.
32. Enumerate those rivers of Asia, which fall into the Frozen Ocean?
33. Into what bay does the Ganges discharge itself?
34. In what part of its course does the Euphrates make the nearest approach to the Mediterranean?
35. What straits are those in the neighbourhood of Gombroon, or Gornon?
36. Does Mecca, or Medina lie the more northerly?
37. What town stands on the Irty?
38. Name the towns in Kamtschatka?
39. What do you call that chain of islands which stretches from Kamtschatka to the Japan Isles?
40. What is the position of Siriam with respect to Pegu?
41. Enumerate the lakes in Western Tartary?
42. How is Batavia situated in regard of Bantam?
43. What is the name of the town in the North of Sumatra?
44. Which are the largest of the Philippines?
45. Of what island is Macasser the capital?
46. Where are the Moluccas?
47. Is the sun ever vertical at Nankin?
48. What river is that in Chinese Tartary?
49. Into what sea does it fall?
50. What town of Persia lies nearest to the borders of India?
51. What river of India falls into the Gulph of Scindi?
52. Where is the island of Hainan?
53. What river unites with the Euphrates before it falls into the sea?
54. What town stands nearest the confluence of those two rivers?
55. What is the relative situation of Ft. St. David, and Negapatam?
56. What river passes Siam?
57. In what direction from Kamtschatka does Bhering's island lie?
58. There is a town in the neighbourhood of Cape Ralsgat, what is its name?
59. What is the capital of Ceylon?
60. Of what country is Samarcand the capital?
61. Between what two islands are the Straits of Sunda?
62. The Meridian of 110° and the parallel of 20° cross each other over one of the Asiatic islands, what is its name?
63. By what country is Tibet surrounded?
64. What islands are those opposite to the coast of Malabar?
65. How is Persia bounded?
66. When it is noon at Afracan, what is the hour at Pondicherry?
67. What town lies nearly in the same latitude with Calicut?
68. Where is Goa?
69. How is Tibet surrounded?
70. What town stands nearest the head of the Persian Gulph?



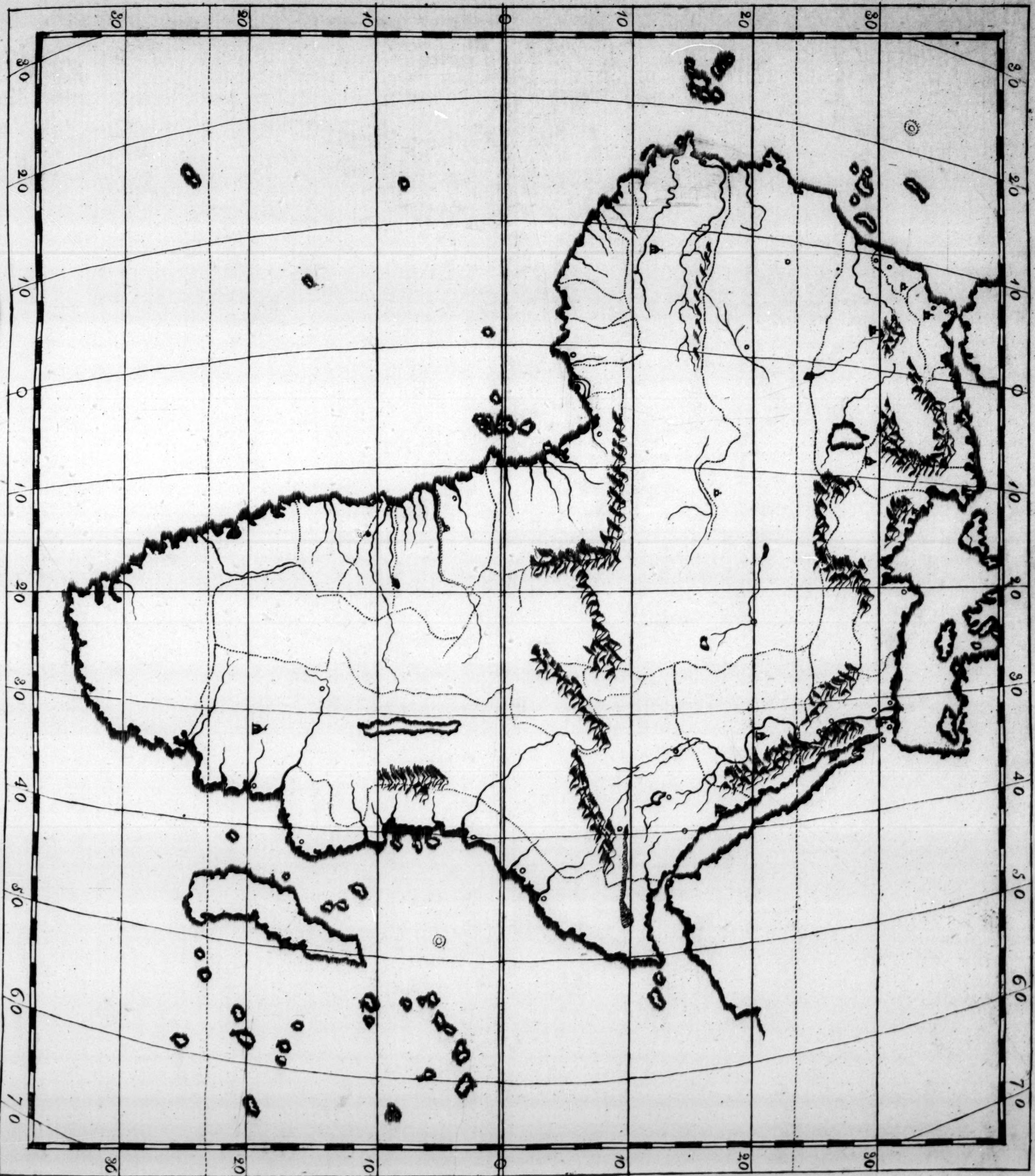
AFRICA



QUESTIONS FOR EXERCISE ON THE MAP OF AFRICA.

1. What is the name of that isthmus which joins Africa to Asia?
2. How is Africa separated from Europe?
3. By what name is the ocean that washes its Western coasts distinguished?
4. What ocean has it to the east?
5. From what country is it separated by the Red Sea?
6. How is the entrance into that sea called?
7. What is the name of the most northerly cape of Africa?
8. Does the larger part of this continent lie in the Northern or in the Southern Hemisphere?
9. How is it situated with respect to the Torrid Zone?
10. What is the name of that island which lies opposite to its most Easterly cape?
11. Which is the largest island that is classed with this division of the globe?
12. What name is given to those islands which lie between that and the continent?
13. Does not one of the African islands lie exactly under the Equator?
14. Name those which are in the neighbourhood of the last-mentioned?
15. What mountains are those which stretch from Morocco to Egypt?
16. Are there any other mountains of note in Africa?
17. Through what countries does the river Nile pass?
18. What towns lie on, or near that river?
19. Enumerate the divisions of Africa which lie on the Mediterranean.
20. What territory occupies the Southern part of Africa?
21. By what cape is that country terminated, and what are its Latitude and Longitude?
22. What is the difference of Latitude and Longitude between this Cape, and Cape Mesurata?
23. There are two towns laid down in this map which lie exactly under the same Meridian, what are their names?
24. What is the direction of the river Senegal?
25. What cape lies near its mouth?
26. One of the rivers of Africa has its source in the Northern and its mouth in the Southern Hemisphere, what is its name?
27. Enumerate the subdivisions of Upper Guinea.
28. Three of the towns inserted in this map have all nearly 30° of N. Lat. what are their names?
29. What island is that which lies near the mouth of the river Gambia?
30. Of the two clusters of islands which lie opposite to the Western coast of Barbary which are the Canaries?
31. What are the names of the two principal capes in Zazara?
32. Enumerate those divisions of Africa, the chief towns of which retain the name of the country.
33. In the Ethiopic Ocean there are three islands, the mutual distances of which are nearly the same, though very considerable, what are their names?
34. What are the names of those two islands to the East of Madagascar, and that town on the continent to the West of the same island, which all lie nearly under the same parallel of Latitude?
35. What Lake is that in the neighbourhood of Gondar?
36. There are two towns on the Niger in this map, what are their names?
37. What is the name of that group of islands which take their name from a neighbouring cape?
38. What two towns in this map lie nearest to the Tropic of Cancer?
39. What country is that of which the river Bravahul is part of the boundary?
40. Where is the lake Zambre?
41. What part of Africa does Upper Ethiopia occupy?
42. Name the principal capes in Upper Guinea?
43. When it is noon at London, what o'clock is it at Alexandria in Egypt?
44. When it is noon at Tunis at what town in Abyssinia is it two in the afternoon?
45. What place laid down in this map has noon at the same time with London?
46. Name those two towns the one in Morocco, the other on the coast of the Mediterranean, where the time differs two hours.
47. What two towns have nearly the same longitude as Tombuctoo?
48. There is a territory in Africa the Southern boundary of which lies nearly under the Equator; another which terminates to the South in a line with the Tropic of Cancer, and two others whose Southern boundaries have the same relation to the Tropic of Capricorn, what are their respective names?
49. What part of Africa lies most contiguous to Europe?
50. There are a few of the principal towns in Africa, which have the same quantity of North latitude and East longitude, name some of them.
51. What is the name of the capital of Congo?
52. What two towns in this map have the least latitude?
53. Which is the most Easterly division of Africa?
54. Name the principal towns in Fez and Morocco, besides the capitals.
55. Between what two parallels, and what two meridians are the Admiralty islands included?
56. Does that point in this map which has neither latitude nor longitude fall on the land, or on the water?
57. What is the latitude, and what the longitude of Taradant?
58. What town is that, the latitude of which is about 14° N. and its longitude nearly 34° E.

AFRICA



N.Y.

AMERICA



REFERENCES TO THE MAP OF NORTH AND SOUTH AMERICA.

NORTH and South America are united by *a.* the Isthmus of Darien, or Panama : their Western Coasts are washed by *A.* the Pacific Ocean. On the East they have *B.* the Atlantic. The Ocean between South America and the South Pole is called the Southern Ocean, and that to the North of North America, the Frozen, or Icy Ocean ; but the whole of its Northern coast has never yet been completely explored. North America is separated from Asia by Bhering's Straits (which the limits of this Map would not allow to be inserted). The islands called the West Indies lie between these two continents, extending from the Tropic of Cancer to the parallel of 10° North Latitude.

NORTH AMERICA,

Consists of the British and Spanish Dominions, and the United States, besides a vast tract of country extending to the Pacific Ocean, inhabited by various tribes of Indians.

The territories subject to Britain are :

- | | |
|---|--|
| <p><i>C. Terre de Labrador, or New Britain, and the country of the Esquimaux, or New North and South Wales, lying round S. Hudson's Bay.</i></p> <p><i>D. Canada, or the Province of Quebec.</i></p> <p><i>E. Nova Scotia, or New Scotland, now divided into two governments, and the new one styled New Brunswick.</i></p> | <p>Quebec,</p> <p>Trois Rivieres,</p> <p>Montreal.</p> <p>Halifax.</p> |
|---|--|

UNITED STATES.

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| <p><i>1. New England, comprising New Hampshire, Massachusetts, Rhode Island, and Connecticut.</i></p> <p><i>2. New York.</i></p> <p><i>New Jersey, and Counties on the Delaware, South of Pennsylvania, and East of Maryland.</i></p> <p><i>3. Pennsylvania.</i></p> <p><i>4. Maryland.</i></p> <p><i>5. Virginia.</i></p> <p><i>6. North Carolina.</i></p> <p><i>7. South Carolina.</i></p> <p><i>8. Georgia.</i></p> | <p>Boston.</p> <p>Albany, and New York.</p> <p>Philadelphia.</p> <p>Annapolis.</p> <p>Williamsburgh.</p> <p>Edenton.</p> <p>Charles-town.</p> <p>Savannah.</p> |
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SPANISH DOMINIONS.

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| <p><i>b. East Florida.</i></p> <p><i>c. West Florida.</i></p> <p><i>F. Louisiana.</i></p> <p><i>G. New Mexico.</i></p> <p><i>H. California.</i></p> <p><i>I. New Navarre.</i></p> <p><i>J. Old Mexico, or New Spain.</i></p> | <p>St. Augustine.</p> <p>Pensacola.</p> <p>New Orleans.</p> <p>Santa Fee.</p> <p>St. Juan.</p> <p>Mexico, Campeachy, in a Peninsula of the same name,</p> <p>Vera Cruz,</p> <p>Acapulco, and</p> <p>Nicaragua.</p> |
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SOUTH AMERICA.

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| <p><i>K. Terra Firma.</i></p> <p><i>L. Peru.</i></p> <p><i>M. Chili.</i></p> <p><i>N. Paraguay, or La Plata.</i></p> | <p>Carthagen, and Portobello, on <i>V.</i> the Gulph of Mexico, and Panama on the Coast of the Pacific Ocean.</p> <p>Quito, Lima, Cusco, and Potosi.</p> <p>St. Jago, and Baldivia.</p> <p>Buenos Ayres.</p> |
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These four belong to the Spaniards, who also took possession of *x.* Terra Magellanica, and afterwards abandoned it.

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| <p><i>O. Brazil, belonging to Portugal.</i></p> <p><i>P. Guiana, the Western part belonging to the Dutch, and the Eastern to the French.</i></p> <p><i>Q. Amazonia, a large tract of country, but little known to Europeans.</i></p> | <p>Salvador, and St. Sebastian.</p> <p>Surinam, Cayenne.</p> |
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ISLANDS.

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| <p><i>a. Newfoundland.</i></p> <p><i>b. Cape Breton.</i></p> <p><i>c. St. John's.</i></p> <p><i>d. Anticosti.</i></p> <p><i>e. Long Island.</i></p> <p><i>f. Bermudas.</i></p> <p><i>g. Bahama.</i></p> <p><i>h. Cuba.</i></p> <p><i>i. Hispaniola.</i></p> <p><i>j. Jamaica.</i></p> <p><i>k. Porto Rico.</i></p> | <p><i>l. Little Antilles.</i></p> <p><i>m. Falkland Islands.</i></p> <p><i>n. Terra del Fuego.</i></p> <p><i>o. Chiloe.</i></p> <p><i>p. Juan Fernandez.</i></p> <p><i>q. Gallapagos.</i></p> <p><i>r. Azores, generally classed with Africa.</i></p> |
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SEAS, BAYS, &c.

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| <p><i>R. Baffin's Bay.</i></p> <p><i>S. Hudson's Bay.</i></p> |
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| <p><i>T. Gulph of St. Lawrence.</i></p> <p><i>U. Bay of Fundy.</i></p> <p><i>V. Gulph of Mexico.</i></p> <p><i>W. Bay of Campeachy.</i></p> <p><i>X. Gulph of Honduras.</i></p> <p><i>Y. Bay of Panama.</i></p> <p><i>Z. Bay of Guayaquil.</i></p> |
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CAPES.

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| <p><i>s. Farewell.</i></p> <p><i>t. St. Augustine.</i></p> <p><i>u. Frio.</i></p> | <p><i>v. Horn.</i></p> <p><i>w. Blanco.</i></p> <p><i>x. Lucas.</i></p> |
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LAKES.

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| <p><i>d. Winipeg.</i></p> <p><i>e. Lake of the Woods.</i></p> <p><i>f. Superior.</i></p> <p><i>g. Huron.</i></p> <p><i>h. Michigan.</i></p> | <p><i>i. Ontario.</i></p> <p><i>j. Erie, all in N. America.</i></p> <p><i>k. Titicaca, and</i></p> <p><i>l. Xarayes, in S. America.</i></p> |
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RIVERS.

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| <p><i>m. St. Lawrence, Hudson, past New York, Delaware by Philadelphia, Susquehannah, West of Delaware.</i></p> <p><i>n. Ohio.</i></p> <p><i>p. Mississipi.</i></p> <p><i>q. Noces.</i></p> <p><i>r. Oronooko.</i></p> <p><i>s. Amazon.</i></p> <p><i>t. St. Francis.</i></p> <p><i>u. Parana.</i></p> <p><i>v. Paraguay, or La Plata.</i></p> |
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STRAITS of Magellan, between Terra del Fuego and the Continent.

w. Davis's Straits.

The principal Mountains in North America are, the Apalachian, or Allegany, which is a long ridge lying on the back of the United States, separating them from Canada and Louisiana. In South America, the Andes, or Cordilleras run from North to South, along the coast of the Pacific Ocean, from the Isthmus of Darien to the Straits of Magellan.

QUESTIONS FOR EXERCISE ON THE MAP OF NORTH AND SOUTH AMERICA.

1. By what Isthmus are these two continents united?
2. Are they unconnected with the other three grand divisions of the Earth?
3. Which of them has the greater number of Lakes?
4. There are two towns in South America, the communication between which by land is not more than sixty miles, but by sea is many thousands: what are their names?
5. What is the name of that town in Old Mexico which stands on the Coast of the Pacific Ocean?
6. What islands are they which lie round the mouth of the Gulph of St. Lawrence?
7. From what lake has the river Paraguay its principal supply of waters?
8. Is not the mouth of the principal river of South America peculiarly situated?
9. What is the Latitude of Cape Farewell?
10. Enumerate the possessions of the Portuguese in South America?
11. What two Gulphs, or Bays are formed by the projection of the Peninsula of Campeachy?
12. Which is the largest of the West India Islands?
13. What is the difference of Latitude between Philadelphia and Mexico.
14. What is the name of that Peninsula of North America which gives name to the Gulph formed by it and the shore of the continent?
15. What Lakes empty themselves into the river St. Lawrence?
16. What is the capital of New Mexico?
17. To which of the European powers does Brazil belong?
18. Opposite to what coast is the island of Chiloe?
19. How is that cluster of islands denominated which lies under and near to the Equator?
20. Which is the most Northerly, and which the most Southerly of the United States?
21. Within what limits of North and South Latitude are the West India Islands included?
22. Into what Gulph does the Mississippi discharge itself?
23. What is the difference of Longitude between Boston and Charlestown?
24. How are those two small islands denominated which lie at a considerable distance from the Eastern shore of the United States?
25. Name the British possessions in America exclusive of her islands.
26. How much does the Longitude of the city of Mexico differ from that of Quebec?
27. Which is the principal town of Virginia?
28. Of what province is Surinam the capital?
29. What town of South America has the least Longitude?
30. Where is Salvador?
31. What Lake is that to the South of Cusco?
32. What territory is watered by the Oronooko.
33. Of what river is the Ohio a branch?
34. Where is the Lake Nicaragua?
35. Of what province is Halifax the chief town?
36. What town of South America differs 50° of Longitude from Campeachy?
37. Which of the towns of South America differs a little more than 10° of Latitude from Quito?
38. One of the towns of Peru lies on the sea-coast, what is its name?
39. The capital of one of the American islands, and the principal town of one of the divisions of South America have the same Longitude, what are their names?
40. Point out a town which has noon at the same time with New Orleans?
41. There is a town in North America which differs 80° in latitude from another in South America, they are equally distant from the Equator, what are their names?
42. What town of South America agrees nearest with Quebec in Longitude?
43. What river passes Santa Fee?
44. What town in South America lies nearest the Tropic of Capricorn?
45. What town on the continent lies nearly under the same parallel of Latitude with the islands of Juan Fernandes?
46. What is the name of the most Southerly promontory of South America?
47. Which is the most Westerly Cape?
48. What is the name of the principal branch of the river Paraguay?
49. Between what two Meridians are the Azores included?
50. What is the Longitude of Cape Frio?
51. What is the name of that long tract of Mountains which stretches all along the Western Coast of South America?
52. There is a town of North America, and a Cape of South America of the same name, in what territory is each situated?
53. What are the relative situations of Acapulco and Vera Cruz?
54. In what direction do the Bahamas lie from Cuba?
55. What is the name of that town the Latitude of which is 20° , and its Longitude 100° ?
56. To what Cape in North America is the Sun vertical on the longest Day?
57. Is not this the case with the inhabitants of the Northern shore of one of the West India Islands?
58. Through what territory does the river Nubes flow?
59. The Latitude of Cairo in Egypt is 30° North, is there any town in this map under the same Parallel?
60. Where is Cayenne?
61. In what Bay does the Island of Anticosti lie?
62. Of what Province is Charlestown the capital?

AMERICA





REFERENCES TO THE MAP OF ENGLAND AND WALES.

ENGLAND is divided into forty counties; Wales into twelve. These are again classed into circuits, those of England into six, and those of Wales into four.

I. The Northern Circuit contains,	
COUNTIES.	TOWNS.
A. Northumberland.	Berwick-upon-Tweed, ALNWICK, Morpeth, North Shields, NEWCASTLE, Hexham.
B. Cumberland.	CARLISLE, Cockermouth, Workington, Penrith, Whitehaven, Kewick.
C. Durham.	South Shields, Sunderland, DURHAM, Stockton.
D. Westmoreland.	APPLEBY, Ambleside, Kendal.
E. Lancashire.	LANCASTER, Clithero, Preston, Ormskirk, Bolton, Wigan, Manchester, Prescot, Liverpool, Warrington.
F. Yorkshire.	Whitby, Richmond, Scarborough, Rippon, Malton, Knaresborough, YORK, Leeds, Beverley, Kingston-upon-Hull, Halifax, Wakefield, Pontefract, Doncaster, Sheffield.
II. The Midland Circuit.	
G. Derbyshire.	Chatsworth, Buxton, Chesterfield, DERBY.
H. Nottinghamshire.	Mansfield, Newark, NOTTINGHAM.
I. Lincolnshire.	Gainsborough. LINCOLN, Boston, Grantham, Stamford.
J. Leicestershire.	Ashby de la Zouch, Bosworth, LEICESTER.
K. Rutlandshire.	OAKHAM, Uppingham.
L. Warwickshire.	Birmingham, Coventry, WARWICK, Stratford.
M. Northamptonshire.	Peterborough, Daventry, NORTHAMPTON.
III. The Norfolk Circuit.	
N. Norfolk.	Lynn, Yarmouth, NORWICH, Thetford.
O. Suffolk.	Leiston, Part of Newmarket St. Edmund's Bury,

COUNTIES.	TOWNS.
P. Cambridgeshire.	IPSWICH, Sudbury, Ely, Part of Newmarket CAMBRIDGE.
Q. Huntingdonshire.	Huntingdon, Kimbolton.
R. Bedfordshire.	REDFORD, Woburn, Dunstable.
S. Buckinghamshire.	BUCKINGHAM, Aylesbury, Wickham.
IV. The Oxford Circuit.	
T. Oxfordshire.	Banbury, Woodstock, OXFORD.
U. Berkshire.	Abingdon, Wallingford, Windsor, READING.
V. Gloucestershire.	Tewkesbury, Cheltenham, GLOUCESTER, Cirencester, Part of Bristol.
W. Monmouthshire.	Abergavenny, MONMOUTH, Chepstow.
X. Herefordshire.	Leominster, HEREFORD, Ross.
Y. Worcestershire.	Stourbridge, Kidderminster, Bewdley, Droitwich, WORCESTER, Evesham.
Z. Shropshire.	Whitchurch, SHREWSBURY, Bridgnorth, Ludlow.
A. Staffordshire.	Newcastle-under-line, Burton-upon-Trent STAFFORD, Litchfield, Wolverhampton.
V. The Western Circuit.	
B. Cornwall.	LAUNCESTON, Saltash, Truro, St. Ives, Falmouth.
C. Devonshire.	Barnstaple, EXETER, Plymouth, Dartmouth.
D. Somersetshire.	Part of BRISTOL, BATH, Frome, Wells, Bridgewater, Taunton.
E. Wiltshire.	Malmesbury, Marlborough, Chippenham, Devizes, Wilton, SALISBURY.
F. Dorsetshire.	Shaftesbury, Sherborn, Poole, DORCHESTER, Weymouth.
G. Hampshire.	WINCHESTER, Southampton, Portsmouth, on Port-sea Island.

VI. The Home Circuit.	
H. Essex.	Harwich, Colchester, CHELMSFORD, Malden.
I. Hertfordshire.	HERTFORD, St. Albans.
J. Kent.	Margate in the Isle of Thanet, Rochester, Chatham, MAIDSTONE, Canterbury, Sandwich, Deal, Dover.
K. Surrey.	Southwark, Kingston, GUILDFORD, CHICHESTER, LEWES, Hastings.
L. Sussex.	The remaining two Counties are not included in any circuit, viz.
M. Middlesex.	LONDON, the metropolis.
N. Cheshire.	Stockport, Knutsford, Macclesfield, Frodsham, Northwich, Congleton, CHESTER.
WALES.	
I. North East Circuit.	
O. Flintshire.	Holywell, St. Asaph, FLINT.
P. Denbighshire.	DENBIGH, Llanrust, Ruthin, Wrexham.
Q. Montgomeryshire.	Welchpool, MONTGOMERY.
II. North West Circuit.	
R. Isle of Anglesey.	Holyhead, BEAUMARIS.
S. Caernarvonshire.	Conway, Bangor, CAERNARVON, Pwllheli.
T. Merionethshire.	Bala, HARLECH, Dolgelly.
III. South West Circuit.	
U. Cardiganshire.	Aberystwith, CARDIGAN.
V. Pembrokeshire.	St. Davids, Haverfordwest, PEMBROKE.
W. Caermarthenshire.	CAERMARTHEN.
IV. South East Circuit.	
X. Radnorshire.	RADNOR.
Y. Brecknockshire.	BRECON.
Z. Glamorganshire.	Swansea, LLANDAFF.

RIVERS.
The Tweed, by Berwick; Tyne, by Newcastle; Eden, by Appleby and Carlisle; Derwent, by Cockermouth; Were, by Durham; Tees, by Stockton; Lun, by Lancaster; Ribble, by Preston; Mersey, by Warrington and Liverpool, receiving the Irwell from Manchester; Ure, near Rippon; Ouse, by York; Aire, by Leeds; Calder, by Wakefield; Don, by Doncaster; Humber, an arm of the sea, by Hull;

Trent, by Nottingham; Weaver, by Northwich; Dee, by Chester; Clwyd, by St. Asaph; Severn, by Shrewsbury; Wye, by Hereford; Upper Avon, by Warwick; Lower Avon, by Bath; Welland, by Stamford; Cam, by Cambridge; Thames, by Oxford, Windsor, and London; Medway, by Chatham; Ex, by Exeter.

LAKES.
a. Coniston Meer. c. Kewick Lake.
b. Winander Meer.

BAYS, CREEKS, &C.
a. The Wash. f. St. Bride's Bay.
b. The Downs. g. Cardigan Bay.
c. Torbay. h. Straits of Menai.
d. Bristol Channel. i. Bay of Morecambe.
e. Milford Haven. j. Solway Frith.

CAPIES.
1. Flamborough Head.
2. Spurn Head.
3. North Foreland.
4. South Foreland.
5. Dungeness.
6. Beachy Head.
7. Spit Head, in Hampshire.
8. St. Alban's Head.
9. The Race of Portland.
10. Start Point.
11. Lizard Point.
12. Land's End.
13. Hartland Point.
14. St. David's Head.
15. Holy Head.
16. Orme's Head.
17. Formby Point.
18. St. Bee's Head.

SMALL ISLANDS.
k. Holy Island.
l. Farne I's.
m. Isle of Wight; Newport.
n. Lundy Island.
o. Anglesey; Holyhead, Beaumaris.
p. Isle of Man; Peel, Douglas, Soder.
q. Walney Island.
The Scilly I's lie about ten leagues to the West of Land's End.

MOUNTAINS.
The whole of Wales is a mountainous tract, but the Snowdon in Caernarvon, and Plinlimmon in Montgomeryshire, are distinguished by their height. The ridge of hills which runs from the borders of Scotland to the very heart of the kingdom have been, not unaptly, called the English Appennines; the most elevated parts of them are the Pendle, between Lancashire and Yorkshire, and the Peak in Derbyshire. The Skiddaw in Cumberland too is remarkable for its altitude. Besides these there are the Malvern Hills, between Herefordshire and Worcestershire, and the Mendip Hills in Somersetshire. The Cheviot Hills form a part of the boundary between England and Scotland.

QUESTIONS FOR EXERCISE ON THE MAP OF ENGLAND AND WALES.

1. Which is the largest, and which the smallest county in England?
2. On what river does the Metropolis stand?
3. What town stands in the Northern extremity of this Map?
4. What name is given to its most Westerly cape?
5. Is not one of the Welsh counties an Island?
6. By what strait is it separated from Caernarvonshire?
7. If a line be drawn from Berwick to the Land's end, what counties will be crossed by it?
8. What two rivers would you have to cross in travelling by the most direct way from Liverpool to Flint?
9. Opposite to what county does the Isle of Wight lie?
10. Where is Canterbury?
11. Which of the circuits includes the greatest number of counties?
12. Enumerate the counties of England and Wales which have no sea-coast?
13. What counties lie on the Thames?
14. Does not a river form the principal part of the boundary between Durham and Yorkshire?
15. Where are the Downs?
16. Is Winchester a sea-port?
17. What is the county town of Cornwall?
18. In what part of Warwickshire does Stratford-upon-Avon lie?
19. Which are the principal towns in Northamptonshire?
20. What county lies on Solway Frith?
21. In what county is Llandaff?
22. There are three towns in the neighbourhood of each other, on the Eastern coast of Kent, what are their names?
23. Through what counties does the Severn flow?
24. What counties border on Scotland?
25. Of what county is Exeter the principal town?
26. What are the other towns of note in the same province?
27. Into what river does the Trent fall?
28. The Bay of Caernarvon is formed by four of the Welsh counties, name them?
29. By what counties is Oxfordshire surrounded?
30. Does the town of Buckingham lie nearly in the centre of the county of the same name?
31. Where is Torbay?
32. How do you call that remarkable point of land in which Yorkshire terminates to the South East?
33. Is there any great inequality in the size of Nottinghamshire and Derbyshire?
34. There is one county in England, and another in Wales remarkable for having each a detached part, what are their names?
35. What county lies directly North of Middlesex?
36. In what circuit is Somersetshire included?
37. How does Westmoreland lie from Lancashire?
38. What river passes Monmouth?
39. Where is Milford Haven?
40. Name the two principal points of land in Kent?
41. Does Hastings lie on the sea-coast?
42. Is Bath an inland town?
43. On what river does Stamford stand?
44. What notable mountain is there in Caernarvonshire?
45. Where are the Mendip Hills?
46. What cape is that not far from Scarborough?
47. In what county is Beachy Head?
48. Which is the most Westerly town in this Map?
49. Does the Isle of Man lie nearer England or Ireland?
50. Where is Lundy Island?
51. What do you call that small cluster of Islets which lies off the coast of Northumberland?
52. What town is that which stands on Winander Meer?
53. Where is the source of the Dee?
54. How are the two towns of Newcastle distinguished from each other?
55. Is not Portsmouth peculiarly situated?
56. What town in Cheshire lies close to the border of Lancashire?
57. Is not there a town in Lancashire which has the same reference to the boundaries between those two counties?
58. What town in Worcestershire lies next to Birmingham in this map?
59. Where is Chichester?
60. Which is the most Northerly town in Shropshire?
61. Does Harwich stand on the Sea?
62. What county is enclosed by Cambridgeshire, Bedfordshire, and Northamptonshire?
63. To what counties does the Wye serve as a boundary?
64. Is Whitby on the Eastern or Western coast of England?
65. How many counties does Wales contain?
66. In what part of Lancashire does its capital stand?
67. Which are the two counties that are not included in any circuit?
68. What part of the boundary of Staffordshire is most irregular?
69. Through what counties do the two Avons flow?
70. Where is Ipswich?
71. How do you call the broad Estuary in the neighbourhood of Lynn?
72. In what county is Weymouth?
73. Where is Plymouth?
74. In what part of Worcestershire does Evesham lie?
75. What town of Yorkshire stands nearest to Derbyshire?
76. There are two towns in Wiltshire which are nearly East and West from each other, what are their names?
77. On which side of the Isle of Anglesey does Beaumaris stand?
78. What town lies opposite to it in Caernarvonshire?
79. What is the principal town in Merionethshire?
80. Besides Hertford what town of note is there in the same county?
81. Bristol stands in two counties which are they?
82. There are two points in this map where four of the midland counties unite, what are the names of those counties?
83. There is a part in the East of Cheshire which nearly corresponds in shape with the Peninsula formed by the Dee and Mersey, to what counties is that tract contiguous?
84. Where is Yarmouth?





REFERENCES TO THE MAP OF SCOTLAND.

SCOTLAND is separated from England (the Southern part of the island of Great Britain) by g. the river Tweed, and the Cheviot, or Tiviot Hills; on every other side it is washed by the Sea, to the East by the German, or British, and to the North and West by the Atlantic Ocean.—The principal of the indentations of its shores are, I. Solway Frith. J. Wigtown Bay. K. Glenluce Bay. L. The Frith of Clyde. M. Loch Fyn. N. Dornoch Frith. O. Cromartie Frith. P. Murray Frith. Q. Frith of Tay, and R. Frith of Forth.

The most general division of Scotland is into the counties North and South of the Forth, of which there are fifteen of the former, and eighteen of the latter.

They are as follows;

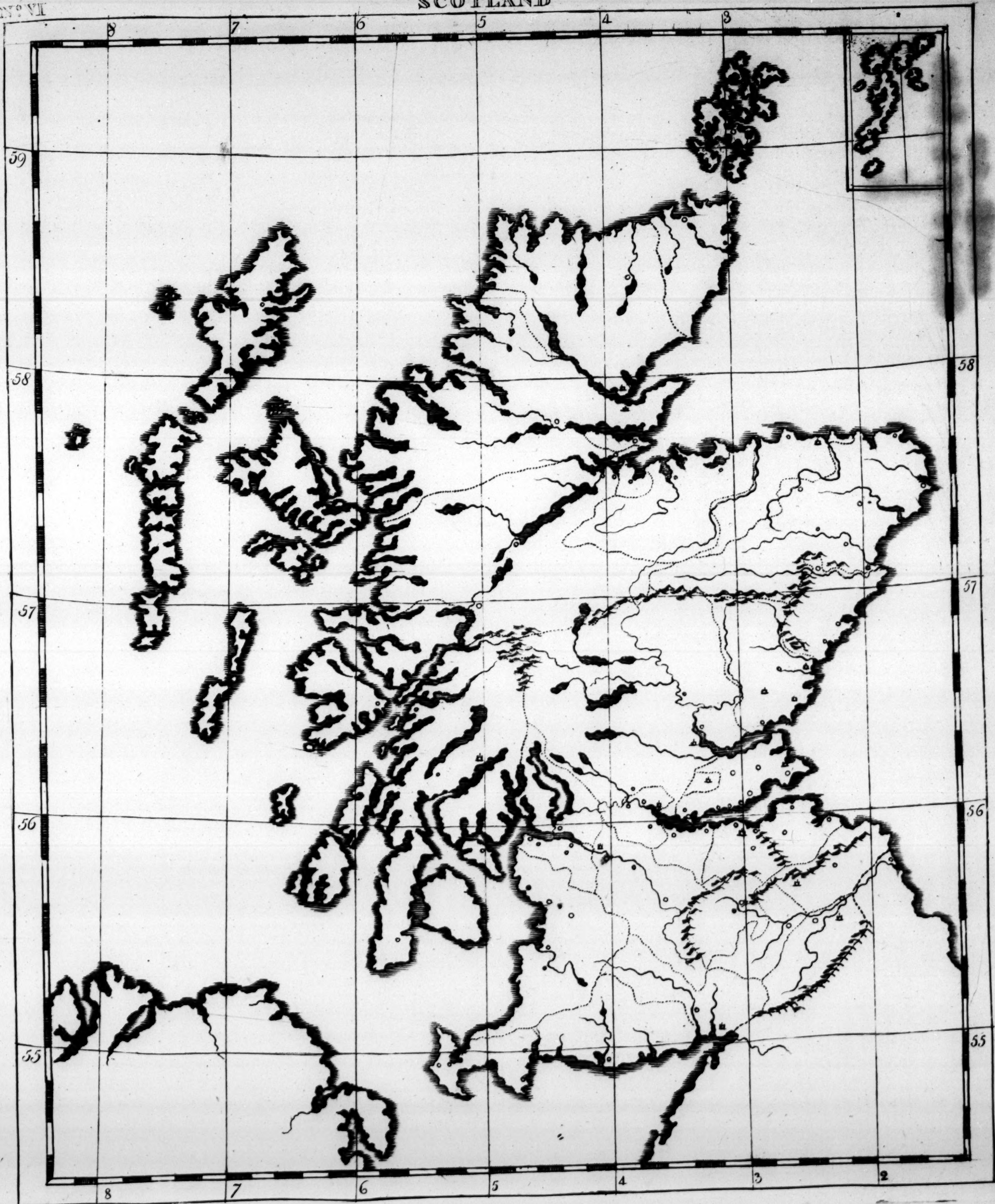
SHIRES.	TOWNS.	SHIRES.	TOWNS.	e. Forth.	g. Tweed.
A. <i>Cathness.</i>	Thurso, WICK.		Anstruther, Dyfart,	f. Clyde.	
B. <i>Sutherland.</i>	Strathy, DORNOCH.		Kirkaldy, Dumfermline,		LAKES, OR LOCHS.
C. <i>Rofs.</i>	Tayne, DINGWALL, Fortrose.		Aberdour, Burnt Island, Inverkythen.	b. Shin.	k. Tay.
D. <i>Cromartie.</i>	CROMARTIE.	T. <i>Renfrew.</i>	Greenock, Port Glasgow,	i. Nefs.	l. Au.
E. <i>Inverness.</i>	INVERNESS, Culloden, Fort Augustus, Fort William, or Inverlochy.		RENFREW, Paisley.	j. Spinie.	m. Lomond.
F. <i>Nairn.</i>	NAIRN.	U. <i>Lanerk, or Clydesdale.</i>	GLASGOW, Rutherglen, Hamilton, LANERK.	Besides the Orkney and Shetland Isles there are a great number to the West of Scotland called collectively the Hebrides, or Western Isles, of which the following are the principal:	
G. <i>Elgin, or Mur- ray.</i>	ELGIN, Forres.	V. <i>Linlithgow.</i>	LINLITHGOW, Queensferry.		
H. <i>Bamff.</i>	Cullen, BAMFF.	W. <i>Edinburgh, or Mid Lothian.</i>	Leith, Musselburgh, EDINBURGH, the capital, Dalkeith.	a. Lewis, or Harris, belonging to Rofs Shire; Stornaway.	
I. <i>Aberdeen.</i>	Frazerburgh, Strathbogie, Peterhead, Old Meldrum, Inverury, Kintore, ABERDEEN.	X. <i>Haddington, or East Lothian.</i>	North Berwick, Dunbar, HADDINGTON.	b. Skye.	
J. <i>Kincardin, or Mearns.</i>	KINCARDIN, Stonehive, INVERBERVY.	Y. <i>Berwick, or Merse, or Lau- derdale.</i>	Dunse, LAUDER.	c. North Uist; n. Lochmaddy, and	
K. <i>Forfar, or An- gus.</i>	Brechin, Montrose, FORFAR, Aberbrothick, Dundee.	Z. <i>Peebles, or Tweeddale.</i>	PEEBLES.	d. South Uist, all belonging to Inver- nessshire.	
L. <i>Perth.</i>	Dunkeld, Blair, Scoon, PERTH, Dumblain.	A. <i>Selkirk.</i>	SELKIRK.	e. St. Kilda.	
M. <i>Argyle.</i>	Dunstaffnage, INVERARY, Killonmer, Campbeltown, in the Peninsula of Cantire.	B. <i>Roxburgh, or Tiviotdale.</i>	Kelfo, Melrofs, JEDBURGH.	f. Col.	
N. <i>Bute, and I. Arran.</i>	ROTHSAY.	C. <i>Air.</i>	Saltcots, Irwin, Kilmarnock, AIR, Mayboll.	g. Tireiy.	
O. <i>Dumbarton.</i>	DUMBARTON,	D. <i>Wigtown.</i>	WIGTOWN, Port Patrick, Stranraer, Whitehorn.	h. Mull; Duart.	
P. <i>Stirling.</i>	STIRLING, Falkirk.	E. <i>Kircudbright.</i>	KIRCUDBRIGHT.	i. Iona, or St. Columb Kill.	
Q. <i>Clackmanan.</i>	Alloa, CLACKMANAN, and Culrofs to the South of the latter.	F. <i>Dumfries.</i>	DUMFRIES, Annan.	j. Jura.	
R. <i>Kinrofs.</i>	KINROSS.	G. <i>The Orkney, and</i>	Kirkwall, in the	k. Ila, or Illa, all except St. Kilda reckoned with Argyle Shire.	
S. <i>Fife.</i>	Coupar, ST. ANDREWS, Falkland,	H. <i>Shetland Isles.</i>	former, Skalloway and Larwick, in the latter.		CAPIES.
					1. Mull of Galloway.
					2. Fairland Point.
					3. Mull of Cantire.
					4. Oreby Point, or Butt of the Lewis.
					5. Cape Wrath.
					6. Strathy Head.
					7. Dunnet Head.
					8. Dungsby Head, near which is Johnny Grot's House.
					9. Farbet Nefs.
					10. Kinnaird's Head.
					11. Fife Nefs.
					12. St. Abb's Head.
					The principal Straits are, <i>Pentland Frith</i> , between Cathness and the Orkneys, and the <i>Minch</i> , between Lewis and Skye.
					Scotland is in general mountainous, and amongst the chief ridges are, the <i>Grampian</i> , which stretch al- most across the country, from Aberdeen to Argyleshire; the <i>Pentland Hills</i> run through Lo- thian, and join those of Twee- dale; Berwick is crossed by the <i>Lammer-Muir Mountains</i> ; and the <i>Cheviot, or Tiviot Hills</i> , as was before observed, separate Scotland from England.
			RIVERS.		
		a. Spey.	c. Dee.		
		b. Don.	d. Tay.		

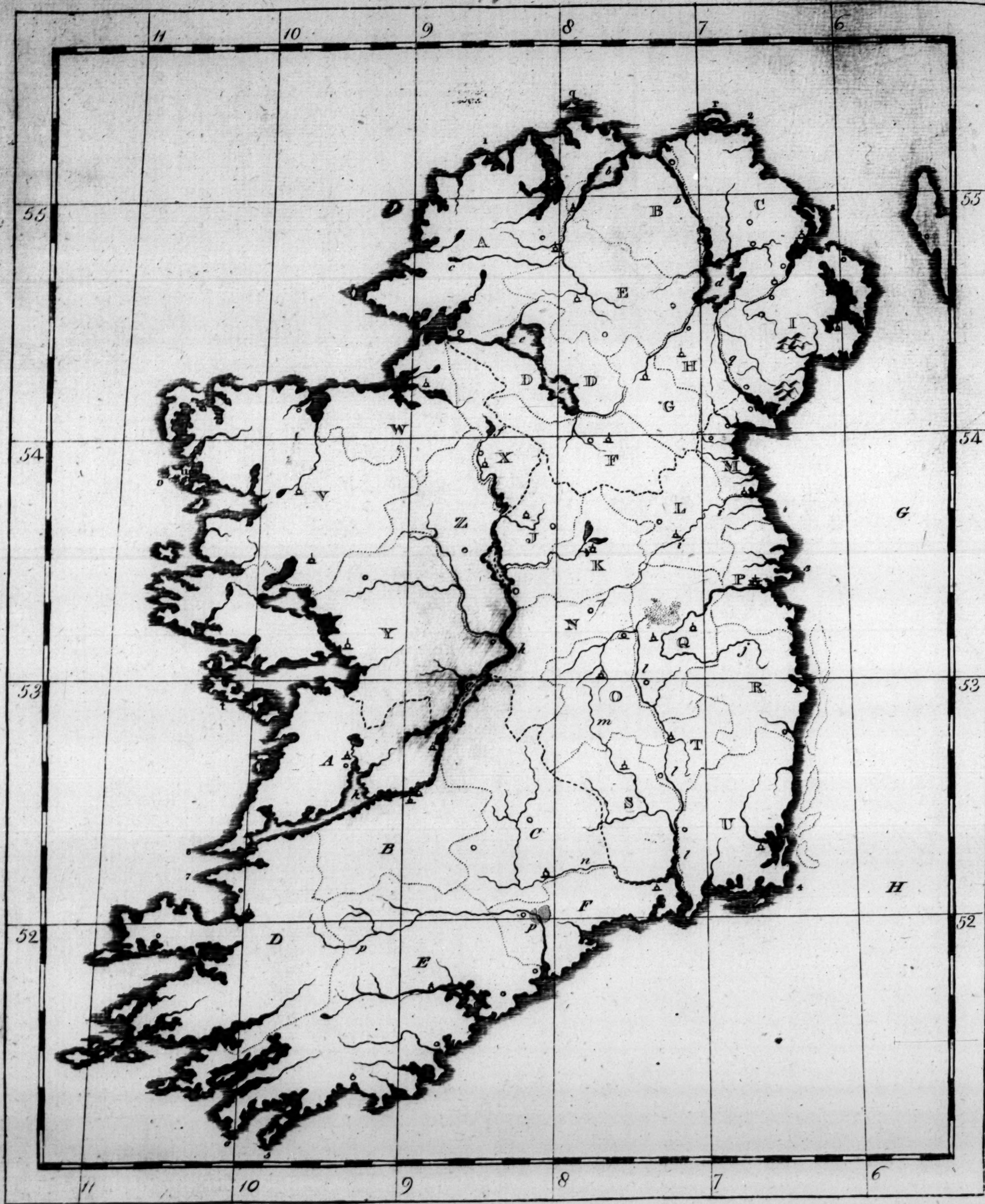
QUESTIONS FOR EXERCISE ON THE MAP OF SCOTLAND.

1. What is the name of the most Northerly promontory in this Map?
2. What Cape lies next to the Westward of it?
3. What Strait lies between these Capes and the Orkney Islands?
4. What town in Scotland has the least Longitude?
5. Opposite to what Shire does the island of Mull lie?
6. Which of the Hebrides lies most to the West?
7. In what Shire is Cape Wrath?
8. Through what counties does the river Clyde flow?
9. What are the principal towns on its banks?
10. The river Spey serves as a boundary to two counties for a considerable distance, what are their names?
11. What towns in this Map stand nearest Fife Nefs?
12. By what counties is Peebles surrounded?
13. What are the boundaries of Selkirkshire?
14. How many of the counties of Scotland border upon England?
15. Which is the most Southerly Cape of Scotland?
16. One of the rivers of Scotland is remarkable for preserving an Easterly direction throughout the whole of its course, what is its name?
17. On what Lake does Fort Augustus stand?
18. Two of the Shires in the North of Scotland may be considered as remarkably situated, in consequence of each being bounded only by a single county, what are their names?
19. Does St. Andrews stand on the sea-coast?
20. Is Dunbar an inland town?
21. What town in this Map is situated nearest to Ireland?
22. Which of the counties of Scotland have no sea-coast?
23. What towns stand on the Tay?
24. In what county is Loch Lomond?
25. Where is Culloden?
26. Lock Shin, and Dornoch Frith, separate two Shires, what are their names?
27. What counties lie on the Frith of Forth?
28. In what direction does the Island of Jura lie from Isla?
29. What is the principal town of that island of which Oreby point forms the Northern extremity?
30. In what province is Kilmarnock?
31. What is the name of the capital of all Scotland?
32. In Cathnesshire there is a town and a cape of the same name, how do you call them?
33. Where is Falkirk?
34. Is Aberbrothick on the Sea?
35. What is the name of that arm of the sea on which Inverary stands?
36. Of what Shire is Inverbervy the principal town?
37. What lake is that in the neighbourhood of Elgin?
38. What town lies at the head of Cromartie Frith?
39. One of the towns of Roxburgh lies on the confines of Berwick, what is its name?
40. Whether is the Eastern, or Western coast of Scotland the more irregular?
41. In what Shire is Loch Tay?
42. What town lies exactly North of Edinburgh?
43. Enumerate the four smallest counties of Scotland?
44. At which extremity of Loch Au does Killonmei stand?
45. Is not there a remarkable Peninsula in the same county?
46. Of what county does the Bay of Glenluce form one of the indentations?
47. By what county is Rossshire limited to the North?
48. How is the island of Iona, or St. Columb Kill situated?
49. What is the latitude of Wigtown?
50. What is the difference of longitude between Edinburgh, and Fort William?
51. Under what parallel does Inverkythen lie?
52. There are three towns laid down in this Map, which all lie under, or near the Meridian of 4° , what are their names?
53. What is the name of that large island, which lies between the Uists and Rossshire?
54. What is the name of that town in Fife, which has noon at the same moment of time with Edinburgh?
55. What are the principal towns in Bamffshire?
56. In what part of the country are the Grampian Hills?
57. What is the name of that island, which together with Bute makes a county?
58. What mountains are those in Berwickshire?
59. How much does Kircudbright differ from Fort William in latitude?
60. On what Frith is Annan situated?
61. In what direction does Irwin lie from Air?
62. What are the principal towns in the largest of the Shetland Islands?
63. Where is Forres?
64. What is the name of the river which passes Inverury?
65. How does Brechin lie from Montrose?
66. What town lies immediately opposite to Culloden on the other side of Murray Frith?
67. Of what county is Wick the capital?
68. There is a town in Ross, and another in Sutherland, which stand on the opposite shores of a Frith, what are their names, and the name of the Frith?
69. Which is the narrowest, and which the broadest part of Scotland?
70. What county is that which is nearly bounded by Perthshire?
71. How is the remaining part of its limits supplied?
72. What is the principal town of Bute?
73. Where is Kinnaird's Head?
74. What town stands nearest to it?
75. How do you call that town which lies on the isthmus in Wigtown?
76. Where are the Lammer-Muir Mountains?
77. There is a town in Roxburgh, which stands at the confluence of two rivers, what is its name?
78. What province is penetrated by Lock Fyn?
79. In what county has the Clyde its source?
80. Where is the town of Saltcots?

SCOTLAND

Nº VI





REFERENCES TO THE MAP OF IRELAND.

IRELAND is divided into four Provinces, viz. **ULSTER**, containing nine counties; **LEINSTER**, including twelve; **CONNAUGHT**, consisting of five; and **MUNSTER** six counties.

IN ULSTER ARE,		COUNTIES	TOWNS	And the Harbours of	
COUNTIES.	TOWNS.				
A. <i>Donegal, also called Tyrconnel.</i>	Raphoe, LIFFORD, Donegal, Ballyshannon.	U. <i>Wexford.</i>	Leighlin. Rofs, WEXFORD.	Dublin, Waterford, Youghall, Dingle, Tralee, Galway,	Wexford, Sligo, Donegal, Cork, and Kinsale.
B. <i>Londonderry.</i>	Coleraine, LONDONDERRY.	CONNAUGHT.			
C. <i>Antrim.</i>	Connor, CARRICKFERGUS.	V. <i>Mayo, & the Mullet.</i>	Killala. CASTLEBAR. BALLINROBE.		
	Antrim, Belfast, Lisburn.	W. <i>Sligo.</i>	SLIGO.		
D. <i>Fermanagh.</i>	INNISKILLEN.	X. <i>Leitrim.</i>	Leitrim, CARRICK.		
E. <i>Tyrone.</i>	OMAGH, Dungannon, Clogher.	Y. <i>Galway.</i>	Tuam, GALWAY, Clonfert.		
F. <i>Cavan.</i>	Kilmore, CAVAN.	Z. <i>Roscommon.</i>	ROSCOMMON.		
G. <i>Monaghan.</i>	MONAGHAN.	MUNSTER.			
H. <i>Armagh.</i>	Charlemont, ARMAGH.	A. <i>Clare.</i>	ENNIS, Killaloe, Clare.		
I. <i>Down.</i>	Donaghadee, Hillsborough, Dromore, DOWNPATRICK. Newry.	B. <i>Limerick.</i>	LIMERICK.		
		C. <i>Tipperary.</i>	Cashel, Tipperary, CLONMEL.		
		D. <i>Kerry.</i>	Ardfert, TRALEE, Dingle.		
		E. <i>Cork.</i>	Youghall, CORK, Cloyne, Kinsale, Rofs.		
		F. <i>Waterford.</i>	WATERFORD, Lismore.		
LEINSTER.					
J. <i>Longford.</i>	LONGFORD, Ardagh.				
K. <i>West Meath.</i>	MULLINGAR, Athlone.				
L. <i>East Meath.</i>	Athboy, TRIM.				
M. <i>Louth.</i>	Carlingford, Dundalk, Louth, DROGHEDA.				
N. <i>King's county.</i>	PHILIPSTOWN.				
O. <i>Queen's county.</i>	Portarlinton, MARYBOROUGH.				
P. <i>Dublin.</i>	DUBLIN, capital.				
Q. <i>Kildare.</i>	NAAS, Kildare, ATHY.				
R. <i>Wicklow.</i>	WICKLOW. Arklow.				
S. <i>Kilkenny.</i>	KILKENNY.				
T. <i>Carlow.</i>	CARLOW,				

This island is washed by the Atlantic to the North and West; it gives the name of Irish Sea G. to the upper part of the Channel which separates it from Great Britain; the lower part from Cardigan Bay being called St. George's Channel. H. The indentations of the land are very numerous, all its coasts abounding with convenient Bays and Harbours, The principal of which are, the Bays of Carrickfergus, Carlingford, Strangford, in the county of Down, Drogheda.

- CAVES.
- | | |
|------------------------------|-----------------------------|
| 1. North Cape, or Hoar Head. | 6. Mizen Head. |
| 2. Fair Head. | 7. Kerry Point. |
| 3. Howth Head. | 8. Cape Lean, or Loop Head. |
| 4. Carnfore Point. | 9. Achill Point. |
| 5. Cape Clear. | |

- LOUGHS, OR LAKES.
- | | |
|------------|-----------|
| a. Swilly. | e. Earn. |
| b. Foyle. | f. Allen. |
| c. Fin. | g. Derg. |
| d. Neagh. | |

- RIVERS.
- | | |
|-------------|--------------------|
| b. Bann. | m. Nure, or Noire. |
| i. Boyne. | n. Suir, and |
| j. Liffy. | p. Blackwater. |
| k. Shannon. | q. New Canal. |
| l. Barrow. | |

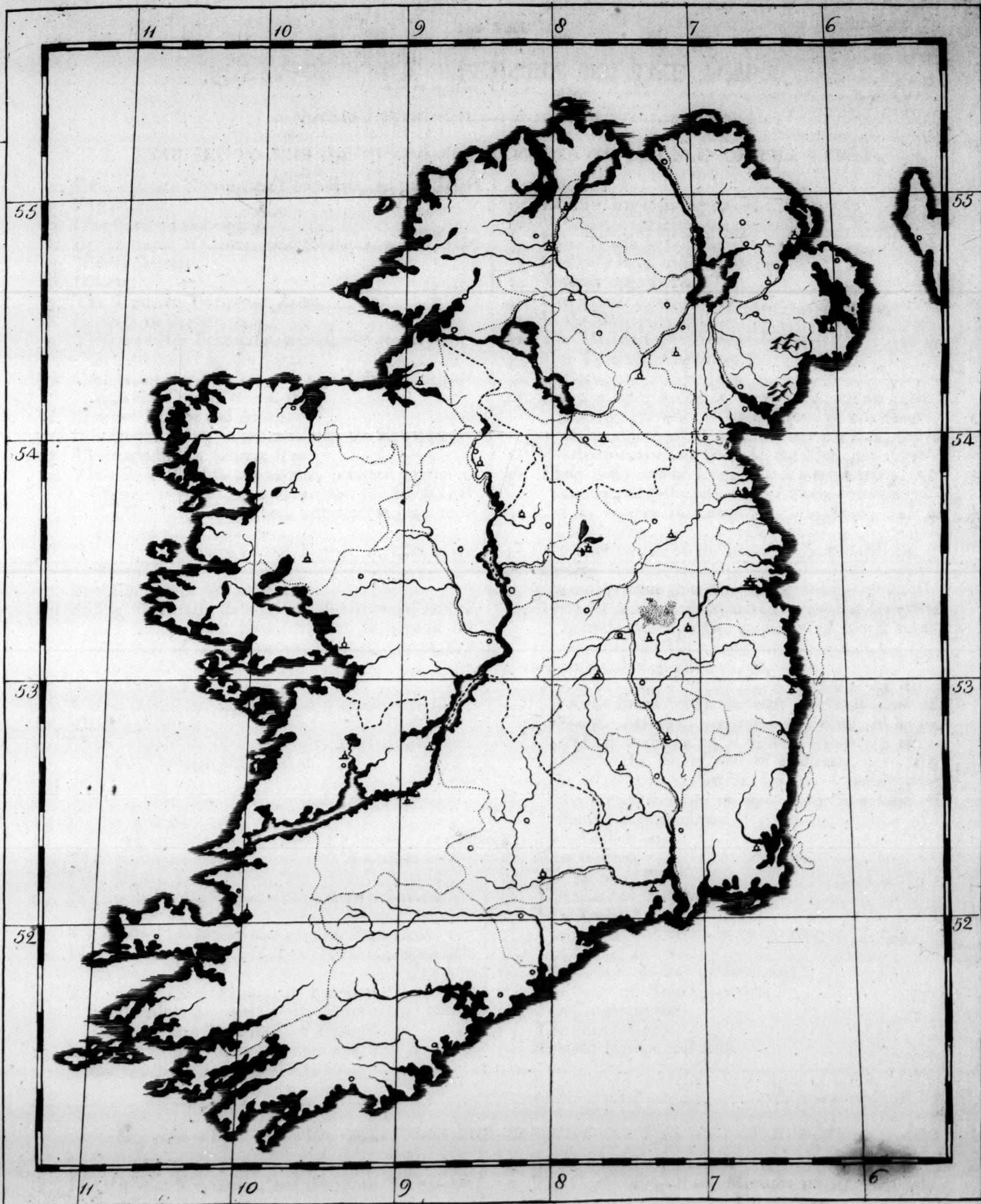
The following are a few of the small islands which lie off the coast of Ireland:

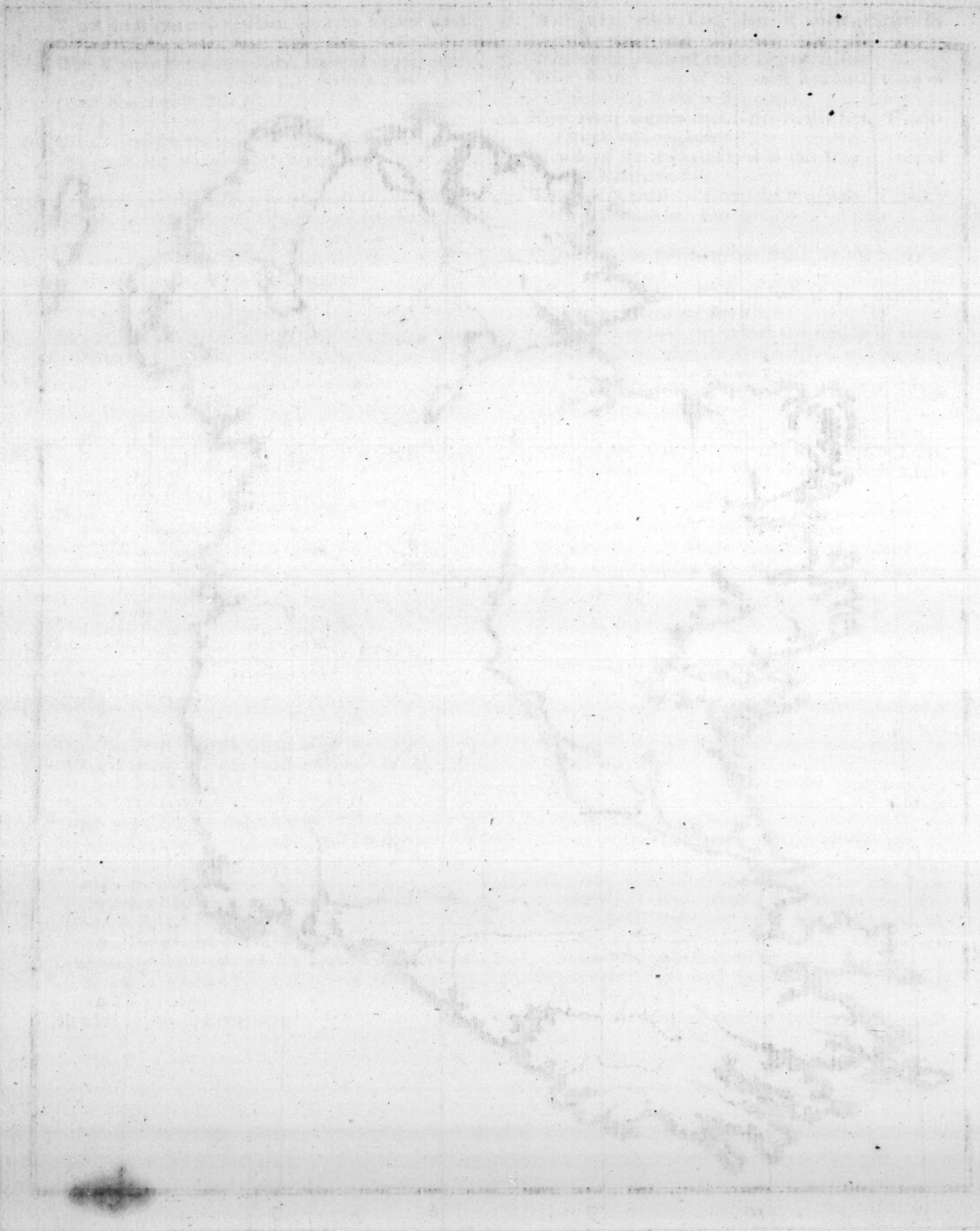
- | | |
|------------------|-----------------|
| q. Ennistrahull. | t. Killeny, and |
| r. Rathlin. | u. Achill. |
| s. Magee. | |

The chief MOUNTAINS in Ireland, are those of *Mourne* in *Down*. About eight miles from Colerain, on the sea-coast, is that great natural curiosity the Giant's Causeway. Amongst the numerous Bogs in this country, that of *Allen*, in the county of *Kildare*, is the most remarkable.

QUESTIONS FOR EXERCISE ON THE MAP OF IRELAND.

1. What is the Sea called which separates Ireland from Great Britain?
2. Which parts of the two islands are most contiguous?
3. How is Ireland environed to the North and West?
4. In what county is Fair Head?
5. Which is the most Southerly Cape?
6. What county of Ireland stretches farthest Westward?
7. Which of the counties are most encompassed by water?
8. Are there any which have no sea-coast?
9. Which of the rivers of Ireland serves as the boundary to the greatest number of counties?
10. On what river does the Metropolis stand?
11. What counties are visited by that river?
12. What river forms the communication between Lough Neagh and the Ocean?
13. What county is separated from Limerick by the river Shannon?
14. In what province is the county of Sligo?
15. What town is that which stands on the narrow passage between the two broader parts of one of the lakes of Ireland?
16. What is the name of that lake which penetrates into the county of Donegal?
17. Where is the Bishopric of Clogher?
18. Name the four counties which share the coast of Lough Neagh?
19. What towns stand on the river Barrow?
20. What river passes Clonmel?
21. What are the counties in the province of Munster, which border on that of Leinster, and those of Leinster which lie contiguous to them?
22. In what county is the Archbishopric of Tuam?
23. What river falls into the sea below Drogheda?
24. By what other counties is Queen's County environed?
25. What county is separated from Kilkenny by the river Barrow?
26. Does the town of Cork stand on the sea-shore?
27. What is nearly the direct distance between Maryborough and Kilmore?
28. What is the Latitude of Wicklow?
29. What is the Longitude of Tralee?
30. In what direction does Cavan lie from Kilmore?
31. Does the Shannon flow through any part of the province of Ulster?
32. What county lies Southward from Longford?
33. Where is Belfast?
34. What is the relative situation of Clare and Ennis?
35. The passage into one of the Bays on the West of Ireland is guarded by a number of small islands, what is its name?
36. In what county is Lough Fin?
37. With what other Lake does it communicate by means of a river?
38. What town is nearest to the Bog of Allen?
39. What is the name of the most Southerly town of Ireland laid down in this map?
40. How many degrees does Lifford differ from Downpatrick in Longitude?
41. Which of the towns inserted in this Map is situated most Northerly?
42. There is a town in Kerry the longitude of which exceeds that of Donaghadee 4° , what is its name?
43. Enumerate the towns which stand on the banks of the Shannon?
44. What towns in the West of Ireland give names to their neighbouring Bays?
45. There are two towns in Ireland very similar in name, point out in what the names differ, and mention the county in which each stands?
46. How many degrees of Latitude is Dundalk to the North of Lismore?
47. Of what county is Mullingar the principal town?
48. What is the name of the river which passes Trim, and the name of the town near to which it falls into the sea?
49. In what county has the Shannon its principal source?
50. Where does the river Suir take its rise?
51. Which is the most Westerly town in this Map?
52. How many counties does the province of Leinster contain?
53. The three principal towns of one county lie nearly North and South of each other, what are their names?
54. There are two towns of the name of Ross, in what county is each situated?
55. One of the Bays on the Eastern coast of Ireland is formed by a curiously shaped Peninsula, what is the name of the Bay, and what town stands on the Peninsula?
56. There is another Peninsula on the opposite coast, very similar in form to the last-mentioned, by what name is it distinguished?
57. Is there any instance in the divisions of this map, of four counties having one common point of union?
58. Imagining yourself at the point where the three counties of West Meath, East Meath, and Kildare unite, and with your face to the South, which of them would lie to the right hand, which to the left, and which before you?
59. In what part of its course does the Liffy take a North East direction?
60. What are the principal capes on the North of Ireland?





ANSWERS

TO THE

QUESTIONS FOR EXERCISE ON THE MAPS.

I. ANSWERS TO THE QUESTIONS FOR EXERCISE ON THE MAP OF THE WORLD.

- | | |
|---|---|
| <ol style="list-style-type: none"> 1. Five: viz. one Torrid, two Temperate, and two Frigid 2. Forty-seven. 3. One hundred and eighty. 4. By the tropic of Cancer, and the Arctic polar Circle. 5. Ninety degrees. 6. Ninety. 7. The Southern Temperate Zone. 8. Forty-three degrees each. 9. They are called Peninsulas, because they are very nearly surrounded by the Ocean. 10. Cape Horn is more than 20° nearer the South pole, than the Cape of Good Hope. 11. Between Europe and Africa. 12. It is crossed nearly in the middle by the Equator. 13. The Ladrone, or Marian Isles. 14. They lie in the Atlantic Ocean, between 37° and 45° degrees of North Lat. and 20° and 30° West Lon. 15. In the Northern Hemisphere between the parallel of 20° and the Tropic. 16. No: there is not any part of Europe included in the Torrid Zone. 17. In the Northern Frigid Zone. 18. Sailing Westward, the Society Islands would be first met with, as the New Hebrides lie beyond the Meridian of 180°, and consequently are in East Longitude. 19. In the West of Asia. 20. It is an inland Sea unconnected with any other. 21. About 34° West. 22. There is considerably more land in the Northern, than in the Southern Hemisphere. 23. Asia. 24. Africa is more than three times as large as Europe. 25. By the Atlantic Ocean. 26. No: they are separated by Bhering's Straits. 27. That which joins North and South America. 28. Fifty degrees East. 29. Principally by the Riphean Mountains and the rivers Don and Wolga. 30. It is divided nearly into two parts by that circle. 31. Between the parallels of Ten and Forty degrees South Latitude. 32. The West India Islands lie between North and South America, within the limits of 10° North Latitude, and the Tropic of Cancer. 33. No: a small part of its Southern end stretches into the Southern Temperate Zone. | <ol style="list-style-type: none"> 34. Luconia. 35. About thirty-two degrees, or 2224 miles. 36. Where it is crossed by the parallel of 10° N. Latitude. 37. From North to South. 38. Hudson's Bay, and Baffin's Bay. 39. Twenty degrees East. 40. One hundred and twenty. 41. In the Ethiopic Ocean. 42. The Meridian 10° West of London. 43. The Tropic of Capricorn. 44. Ceylon. 45. On that coast in the North of Asia, which lies on Bhering's Straits; in some of the Friendly islands; at the most Easterly cape of New Zealand, and all other places which lie under the Meridian of 180°. 46. Their difference of Longitude is sixty degrees; and consequently the difference of time, reckoning fifteen degrees of Longitude to an hour, will be four hours. 47. The Eastern side of the Island of Newfoundland. 48. Borneo. 49. Something more than seventy degrees. 50. They lie at the Eastern entrance into the Gulph of Mexico, between the continent of North America, and the West India islands. 51. About thirty degrees. 52. The Southern end of the island of Japan has noon twenty hours before the most Westerly point in North America: consequently, when it is six o'clock at the latter, it must be two in the afternoon at the former, but of a different day; that is, if it were six in the evening of Saturday at the latter, it must be two in the afternoon of Sunday at the former. 53. The Arabian Sea. 54. New Guinea. 55. The German Sea. 56. The island of Spitzbergen. 57. New Zealand. 58. The Red Sea separates Africa from a part of Asia. 59. The Bay of Bengal. 60. The Gulph, or Bay of Siam. 61. The Shore of North America. 62. The Caribbean Sea. 63. The Sea of Corea. 64. Between Europe and Asia. |
|---|---|

II. ANSWERS TO THE QUESTIONS FOR EXERCISE ON THE MAP OF EUROPE.

- | | |
|---|--|
| <ol style="list-style-type: none"> 1. It joins Asia in the East. 2. The Riphean Mountains, and the rivers Wolga and Don lie in that quarter. 3. Much more irregular in proportion to its extent. | <ol style="list-style-type: none"> 4. By the Mediterranean Sea. 5. The Coasts of Spain and Morocco are separated only by the narrow Strait of Gibraltar. 6. Cape North. |
|---|--|

7. Yes: and the most remarkable are those of the Crimea, or Crim Tartary, and the Morea in Turkey; Denmark and Italy too are Peninsulas, and the countries of Sweden and Norway, taken together, as well as Spain and Portugal, have this form
8. Russia.
9. Yes: the White Sea.
10. The passage into the Baltic Sea is divided into three straits, by the islands of Zealand and Funen, besides which there are several smaller islands.
11. Constantinople. The Bosphorus, which lies between it and the Asiatic shore, is very narrow.
12. Those laid down in this map are Ratibon, Vienna, Presburg, Buda, Belgrade, Nicopoli, and Silistria.
13. Switzerland is separated from France, Germany, and Italy, by the Alps.
14. These are the Rhine and the Rhone; the former of which, after traversing the Eastern side of Germany, crosses the United Provinces, and falls into the German Sea: the latter takes a Southerly direction, and after passing Lyons, falls into the Mediterranean, at some distance West of Marfeilles
15. The island of Candia.
16. Switzerland and Hungary have no sea-coast, and Poland very little.
17. On the Tiber.
18. Great Britain.
19. Cape North, Statt, Lindenau, or Naze of Norway, Ushant, Ortegal, Finisterre, St. Vincent, de Gates, de Palos, Spartavento, Matapan, and Cape Passaro, the Southern promontory of the island of Sicily.
20. Three: the Loire, the Charente, and the Garonne.
21. The Gulph of Bothnia.
22. Amsterdam, and Lyons nearly.
23. No: the latitude of Gibraltar, one of its more Southern points, is more than 35° .
24. A considerable part of Norway, the tract of Sweden on each side of the river Tornea, and the whole of the Northern coast of Russia, except what is washed by the lower part of the White Sea.
25. Copenhagen the capital of Denmark stands on the Eastern coast of the island of Zealand, nearly opposite to Lunden.
26. The River Nieper separates Poland from Russia.
27. Archangel, at the mouth of the Dwina; Stockholm, at the entrance into the lake Maler; Tornea, at the mouth of the river of the same name; St. Petersburg, on the passage between lake Ladoga, and the Gulph of Finland; Riga, at the mouth of the Dwina; Dantzick and Elbing, at separate mouths of the Vistula; Hamburg, not far from the mouth of the Elbe; Antwerp, on the Scheldt; Havre-de-grace, below where the Seine falls into the Sea; and Rouen, a little higher up; Nantes, near the confluence of the Loire with the sea; Rochfort, at the entrance into the Charente; Oporto, at the mouth of the Douro; and Lisbon, of the Tagus; Rome a little way up the Tiber; Bielgorod, at the mouth of the Niester; and Ocza-kow, at that of the Nieper.
28. The Straits of Dover.
29. This is the case with the Archipelago.
30. Two in the afternoon.
31. About thirty degrees.
32. The Seine.
33. Twenty degrees.
34. Cracow, Warsaw, Thorn, Culm, Marienburg, Elbing, and Dantzick.
35. No: the Ebro discharges itself into the Mediterranean
36. Yes; they are separated by the Dofrian mountains.
37. The Scagen, or Scaw.
38. The lakes of Russia and Sweden are the largest.
39. Nishney Novogorod.
40. The Orkney and Shetland Isles.
41. In the North of Germany, on the river Spree, a branch of the Elbe.
42. Iceland.
43. It lies at a small distance to the North of it.
44. Yes: between France and Spain.
45. The more Southerly is called the Dardanelles, or Hellespont, or Straits of Gallipoli; and that which leads to the Black Sea, the Bosphorus of Thrace, or Straits of Constantinople.
46. To the North of it.
47. By the Straits of Bonifacio.
48. The Hecla, in Iceland; the Vesuvius, near Naples; the Etna in Sicily; and Stromboli, one of the Lipari Isles.
49. Ortegal, Finisterre, de Gates, and de Palos.
50. About fifteen degrees.
51. It flows from West to East, and falls into the Gulph of Venice, or Adriatic Sea.
52. Dresden and Hamburg.
53. Into the Baltic.
54. The Bay of Taranto.
55. The Onega and Ladoga, besides some smaller ones.
56. They lie between the North of Russia and Asia.
57. That between Zealand and the continent is called the Sound; the one between that island and Funen, the Great Belt; and the remaining one the Little Belt.
58. Madrid, the capital of Spain, is situated more nearly in the centre of the kingdom, than any other principal city in Europe.
59. Russia to the East; Turkey and Hungary to the South; Germany to the West; and Prussia to the North West.
60. Malta.
61. Presburg.

III. ANSWERS TO THE QUESTIONS FOR EXERCISE ON THE MAP OF ASIA.

1. No: Malacca, its most Southerly Peninsula, terminates about a degree North of the Equator.
2. Sumatra, Borneo, Celebes, and Gilolo.
3. Yes.
4. Nearly half of Arabia, a considerable portion of Indostan, almost the whole of India East of the Ganges, and a narrow tract in the South of China.
5. By far the greatest part of it.

6. Arabia.
7. Siberia.
8. By Western Tartary to the East, Persia to the South, Georgia to the West, and Siberia to the North.
9. Kamtschatka, Corea, and Malacca. The Mogul's Empire too is frequently called a Peninsula, and Arabia approaches still nearer to that description.
10. The former is called the Coast of Coromandel, and the latter the Coast of Malabar.
11. Astracan.
12. The Levant Sea.
13. Ispahan is the capital of Persia.
14. Borneo: it is also considered as the largest island in the World.
15. Mecca, Muschat, Cambaya, Calcutta, and Canton.
16. Shiraz.
17. Burza and Smyrna.
18. Malacca has the least, and Ochotsk the greatest latitude.
19. Damascus lies North East from Jerusalem.
20. Teflis.
21. Bagdat stands on the river Tigris.
22. In Chinese Tartary.
23. The island of Ceylon.
24. By the Straits of Sunda.
25. Yes: Mocha and Aden.
26. By the Peninsula of Corea, a part of Eastern Tartary and China.
27. Formosa.
28. The river Burampooter.
29. Orenburg.
30. Burza, Samarcand, and Pekin; the same may be said also of Erzerum.
31. Pondicherry.
32. The Oby, the Jenisca, and the Lena, all fall into the Frozen Ocean.
33. Into the Bay of Bengal.
34. A little to the East of Aleppo.
35. The Straits of Ormus.
36. Medina.
37. Tobolskoi.
38. These are Kamtschatka, Awatchka, and Bolscherefskoi.
39. The Kurile Isles.
40. Syriam lies at a small distance to the South of Pegu.
41. Aral, Zaifan, or Saifan, and Balkasi.
42. Batavia lies to the East of Bantam.
43. Achen.
44. Luconia and Mindanao.
45. Macassar is the Capital of Celebes.
46. Between Celebes and New Guinea.
47. No: Nankin lies near 10° North of the Tropic.
48. The Amour.
49. Into the Sea of Kamtschatka.
50. Condahor.
51. The river Indus.
52. In the Gulph of Tonquin.
53. The Tigris.
54. Bassora.
55. The former lies to the North of the latter.
56. The river Menan.
57. Bhering's Island lies East of Kamtschatka.
58. Muschat.
59. Candy.
60. Of Independent, or Western Tartary.
61. Between the Islands of Sumatra and Java.
62. Hainan.
63. Georgia has Siberia to the North; Turkey to the West; Persia to the South, and the Caspian Sea to the East.
64. The Laccadives.
65. To the North it has Georgia, the Southern end of the Caspian Sea, and a part of Western Tartary; it borders on Indostan to the East; its Southern coast is washed by the Gulphs of Ormus and Persia, and Turkey lies on the West.
66. Two in the afternoon.
67. Pondicherry.
68. On the coast of Malabar, South of Bombay, and North of Calicut.
69. By Western Tartary, and a corner of Chinese Tartary to the North; China lies to the East, and India East of the Ganges to the South; on the West it is bounded by the Mogul's Empire.
70. Bassora.

IV. ANSWERS TO THE QUESTIONS FOR EXERCISE ON THE MAP OF AFRICA.

1. The Isthmus of Suez.
2. By the Mediterranean Sea.
3. The part of it to the North of the Equator is called the Atlantic, and that to the South the Ethiopic Ocean.
4. The Eastern, or Indian Ocean.
5. From Arabia.
6. The Straits of Babelmandel.
7. Cape Bona, in Algiers.
8. That part of it which lies North of the Equator exceeds the other considerably in extent.
9. The greater part of it lies in the Torrid Zone.
10. Socotra lies opposite to Cape Guardafui.
11. Madagascar.
12. The Comora Isles.
13. Yes: the Island of St. Thomas.
14. Anaboa, or Annabon, and Prince's Island.
15. The Atlas Mountains.
16. Yes: there are the mountains of the Moon, which lie in the South of Abyssinia; the Sierra Leona, in the North of Benin; and the Peak of Teneriffe, in the island of that name.
17. It rises in Abyssinia, crosses Nubia, and after traversing Egypt from North to South, falls into the Mediterranean.
18. Sennaar, Nubia, Thebes, Girge, Geeza, Cairo, Damietta, and Alexandria.
19. Fez, Algiers, Tunis, Tripoli, Barca, and Egypt.
20. Caffraria, or the Land of the Hottentots.
21. By the Cape of Good Hope, the Latitude of which is about 34° South, and its Longitude 20° East.
22. The difference of Latitude between Cape Mesurata, and the Cape of Good Hope is something above 66° , and their difference of longitude not more than 4° .

23. Dixan and Melinda, both lie under the Meridian of 40° West Longitude.
24. It flows from East to West, and falls into the Ocean below the town of the same name.
25. Cape Verd.
26. That is the case with the river Zebec.
27. Sierra Leon, Grain Coast, Ivory Coast, Gold Coast, Slave Coast, and Benin.
28. Taradant, Geeza, and Suez, all lie nearly under the parallel of 30° , and Cairo exactly so.
29. The island of Goree.
30. The more Southerly.
31. Cape Bajador, and Cape Blanco.
32. Fez, Morocco, Tafilet, Algiers, Tunis, Tripoli, Benin, Nubia, Loango, Benguela, Magadoxa, Monomotopa, and Sofala, all give names to their capitals; the names of the other chief cities have no analogy to that of the divisions to which they belong.
33. St. Matthew, Ascension, and St. Helena.
34. The islands of Mauritius and Bourbon, and the town of Sofala.
35. The Lake Dambea.
36. Tombut and Cashna.
37. The Cape Verd Islands.
38. Tegeffa and Thebes.
39. Mataman.
40. In Monemugi.
41. The North Eastern part.
42. Mesurado, Palmas, and de Lopo.
43. Two in the afternoon.
44. At Dixan.
45. Oran.
46. Taradant and Tolometa.
47. Oran and Cape Coast Castle.
48. The Southern boundary of Benin lies nearly under the Equator; Egypt terminates to the South in a line with the Tropic of Cancer, and Monomotapa, as well as Mataman, have their Southern boundaries nearly in the direction of the Tropic of Capricorn.
49. Fez.
50. This is the case with Alexandria, Cairo, and Geeza.
51. St. Salvador.
52. Brava and Melinda lie nearest to the Equator.
53. Adel.
54. Ceuta, Tangier, Sallee, Suz, and Taradant.
55. Between the parallel of 10° South Latitude, and the Equator; and the Meridians of 50 and 60 degrees East Longitude.
56. On the Water.
57. The latitude of Taradant is 30° North, and its longitude 10° West.
58. Sennaar, in Abyffinia.

V. ANSWERS TO THE QUESTIONS FOR EXERCISE ON THE MAP OF NORTH AND SOUTH AMERICA.

1. By the Isthmus of Darien or Panama.
2. They are: being separated from Europe and Africa by the Atlantic, and from Asia by the Pacific Ocean.
3. South America, as far as we know, has only two lakes of consequence, whereas those of North America are numerous.
4. Porto-Bello and Panama lie less than a degree from each other, on opposite sides of the Isthmus of Darien; but the whole peninsula of South America must be circumnavigated, to get from the one to the other by Sea.
5. Acapulco.
6. Newfoundland, St. John's, Anticosti, and Cape Breton.
7. From the lake Xarayes.
8. The mouth of the Amazon lies exactly under the Equator.
9. Sixty degrees North.
10. The only territory of the Portuguese on the continent is Brasil.
11. That to the North takes the name of the Peninsula; the more Southerly one is called the Gulph of Honduras.
12. Cuba.
13. Twenty degrees.
14. California.
15. Winipeg lake, and the lake of the Woods, communicate with lake Superior, which is likewise connected with the lakes Huron, Michigan, Erie, and Ontario; and it is from the last, that the river St. Lawrence receives the waters which flow from all the rest.
16. Santa Fee.
17. To the Portuguese.
18. It is opposite to the coast of Chili.
19. They are called the Gallapagos.
20. New England is the most Northerly, and Georgia the most Southerly of the United States.
21. Between the parallel of 10° North and the Tropic of Cancer.
22. Into the Gulph of Mexico.
23. Nearly ten degrees.
24. They are called the Bermudas.
25. Terre de Labrador, Canada, and Nova Scotia, all belong to Great Britain.
26. Thirty degrees.
27. Williamsburg.
28. Surinam is the chief town of the Dutch part of Guiana.
29. Salvador.
30. In Brazil.
31. The lake Titicaca.
32. The province of Terra Firma.
33. The Ohio is a branch of the Mississippi.
34. In the Southern part of the province of Old Mexico.
35. Halifax is the capital of Nova Scotia.
36. Salvador.
37. Carthagen.
38. Lima.
39. This is the case with Buenos Ayres, in Paraguay, and the capital of the Island of Cape Breton.
40. Campeachy lies under the same Meridian, and consequently has noon at the same time as New Orleans.
41. Baldivia in South America lies 40° South, and Philadelphia the same number of degrees to the North.

of the Equator, consequently their difference of Latitude is 80° .

42. Cusco.
43. The river Nubes.
44. St. Sebastian.
45. St. Jago.
46. Cape Horn.
47. Cape St. Augustine.
48. The river Parana.
49. Between the Meridians of 20° and 30° .
50. A little more than 40° West.
51. The Andes, or Cordilleras.
52. These are the town of St. Augustine, in East Florida, and Cape St. Augustine, in Brazil.

53. They are nearly East and West of each other.
54. They lie to the North of that island.
55. Mexico.
56. Cape Lucas.
57. Yes: the inhabitants of the North Western coast of the island of Cuba have the sun over-head on the 21st of June.
58. Through New Mexico.
59. Yes: St. Augustine.
60. In the French part of Guiana.
61. In the Bay of St. Lawrence.
62. Of South Carolina.

VI. ANSWERS TO THE QUESTIONS FOR EXERCISE ON THE MAP OF ENGLAND AND WALES.

1. Yorkshire is the largest, and Rutlandshire the smallest.
2. London stands on the river Thames.
3. Berwick-upon-Tweed.
4. The Lands-End.
5. Yes: Anglesey is an Island.
6. By the Straits of Menai.
7. Northumberland, Cumberland, the Western corner of Westmoreland, the detached part of Lancashire, the Western extremity of Denbighshire, the Eastern part of Caernarvonshire, nearly the middle of Pembrokeshire, and the Western termination of Cornwall.
8. The Mersey, and the Dee.
9. The Isle of Wight lies at a small distance from the Southern side of Hampshire.
10. Canterbury is in Kent.
11. The Oxford circuit, which includes eight.
12. Derbyshire, Nottinghamshire, Shropshire, Staffordshire, Leicestershire, Rutlandshire, Radnorshire, Brecknockshire, Herefordshire, Worcestershire, Warwickshire, Northamptonshire, Huntingdonshire, Cambridgeshire, Wiltshire, Oxfordshire, Berkshire, Buckinghamshire, Bedfordshire, Hertfordshire, Middlesex, and Surry; in all twenty-two inland counties. It may be remarked too, that Westmoreland and Montgomeryshire have very little sea-coast.
13. The Thames rises in Gloucestershire, and separates Berkshire from Oxfordshire and Buckinghamshire; Surry from Middlesex, and a corner of Buckinghamshire, and Kent from Essex, and a small angle of Middlesex.
14. Yes: the Tees, in the whole of its course, separates those two counties.
15. That name is given to the small indentation of the land on the Eastern coast of Kent.
16. No: it stands considerably inland.
17. Launceston.
18. Near that corner where the Avon enters Worcestershire, and where the boundaries of that county Somersetshire, and Warwickshire all meet in a point.
19. Peterborough, Daventry, and Northampton.
20. Cumberland.
21. It is the capital of Glamorganshire.
22. Sandwich, Deal, and Dover.
23. Its source is in Montgomeryshire, near Plinlimmon-hill; and, after taking a circuitous course through Shropshire, it enters Worcestershire North of Bewdley, and flows through that county in a Southerly direction, till it receives the Avon near Tewkesbury; from whence it takes its course past Gloucester, to the Bristol Channel.
24. Northumberland and Cumberland.
25. Exeter is the county town of Devonshire.
26. Barnstaple, Plymouth, and Dartmouth.
27. Into the Humber.
28. Caernarvonshire, Merionethshire, Cardiganshire, and Pembrokeshire.
29. It has Warwickshire and Northamptonshire to the North; Buckinghamshire to the East; Berkshire lies to the South, and Somersetshire to the West.
30. No: it is situated in the North-West part of the county, near the point where it unites with Northamptonshire and Oxfordshire.
31. In Devonshire; a little to the Northward of Dartmouth.
32. Spurn Head.
33. No: they are nearly of a size.
34. This is the case with Lancashire and Flintshire.
35. Hertfordshire.
36. In the Western Circuit.
37. Westmoreland lies to the North of Lancashire.
38. The Wye.
39. In Pembrokeshire.
40. North Foreland, and South Foreland.
41. Yes: on the Southern side of Sussex.
42. Yes: but it communicates with the sea, by means of the Lower Avon.
43. On the Welland.
44. The Snowdon.
45. In Somersetshire.
46. Flamborough Head.
47. In Sussex.
48. St. Ives.
49. Its Northern end is nearer Westmoreland, than any part of it is to Ireland.
50. In the Bristol channel off the coast of Devonshire.
51. The Farne Islands.
52. Ambleside.

53. In Merionethshire, near to Bala.
54. That in Northumberland has the name of the river Tyne, on which it stands, attached to it: the Staffordshire one is called Newcastle-under-line.
55. It stands on the small island of Portsea, between the Isle of Wight, and the coast of Hampshire.
56. Stockport.
57. Yes: Warrington.
58. Stourbridge.
59. In Sussex, on the sea-coast, not far from the borders of Hampshire.
60. Whitchurch.
61. Yes: in the North East corner of Essex.
62. Huntingdonshire.
63. It forms almost the sole limit between Radnorshire and Brecknockshire; supplies a part of the boundary between Worcestershire and Gloucestershire, and constitutes the only separation between this latter county and Monmouthshire.
64. On the Eastern coast.
65. Twelve.
66. In the North-West, on the river Lun.
67. Middlesex and Cheshire.
68. The Western side.
69. The Upper Avon rises in that corner of Leicestershire, where it meets in a point with Northamptonshire and Warwickshire; crosses the latter county in a South Easterly direction, dividing it into two unequal parts; enters Worcestershire

- in the neighbourhood of Stratford, and, traversing the tract near to its Southern border, joins the Severn near Tewkesbury. The Lower Avon has a much shorter route, rising in Wiltshire, and sweeping round the North East corner of Somersetshire, it serves, for a small distance, as the boundary between that county and Gloucestershire, and falls into the Severn below Bristol.
70. It is the chief town of Suffolk.
71. It is called the Wash.
72. Weymouth is the most Southerly town in Dorsetshire.
73. In Devonshire, on the opposite coast to Dartmouth.
74. On the Avon, in the South of Worcestershire.
75. Sheffield.
76. The more Westerly one is Chippenham, the other is Marlborough.
77. On the Eastern side, upon the Straits of Menai.
78. Bangor.
79. Harlech.
80. St. Alban's.
81. Gloucestershire and Somersetshire.
82. Shropshire, Staffordshire, Warwickshire, and Worcestershire, meet near to Stourbridge: Staffordshire, Derbyshire, Leicestershire, and Warwickshire, all join near Litchfield.
83. It terminates on the borders of Yorkshire, and on its other sides, it has Lancashire and Derbyshire.
84. On the Eastern coast of Norfolk.

VII. ANSWERS TO THE QUESTIONS FOR EXERCISE ON THE MAP OF SCOTLAND.

1. Dungsby Head.
2. Dunnet Head.
3. Pentland Frith.
4. Peterhead.
5. Opposite to Argyleshire.
6. The small island of St. Kilda.
7. In Sutherland.
8. It has its source in the South of Lanerk, through the middle of which it flows Northerly, and, after crossing the North East corner of Renfrewshire, it increases considerably in breadth, and constitutes the boundary between that county and Dumbartonshire.
9. Lanerk, Hamilton, Rutherglen, Glasgow, Renfrew, Dumbarton, Port Glasgow, and Greenock.
10. Murray and Bamff.
11. St. Andrew's and Anstruther.
12. On the West it has Lanerk, on the North Edinburgh, and on the East Selkirk.
13. Peebles, a corner of Edinburgh, Berwick, Roxburgh, and Dumfries.
14. Three: Berwick, Roxburgh, and Dumfries.
15. The Mull of Galloway.
16. The Dee.
17. At the Southern extremity of Loch Ness.
18. Cathness joins only to Sutherland, and the whole of the land boundary of Sutherland is formed by a part of Ross.
19. Yes.
20. No: it is on the sea-coast.
21. Port Patrick.
22. No part of Kinross, Lanerk, Peebles, Selkirk, or Roxburgh, is near the sea; and Stirling and Clackmanan lie quite at the head of the Frith of Forth.
23. Dunkeld, Scoon, Perth, and Blair on one of its branches.
24. In Dumbartonshire.
25. Near Inverness, on Murray Frith.
26. Sutherland and Rosshire.
27. Fife, a corner of Perth, Clackmanan, Stirling, Linlithgow, Edinburgh, and Haddington.
28. To the North of it.
29. Stornaway is the principal town of the Isle of Lewis.
30. In Airshire.
31. Edinburgh.
32. Strathy and Strathy head.
33. In Stirlingshire.
34. Yes.
35. Loch Fyn.
36. Of Kincardin, or Mearnsshire.
37. Loch Spinie,
38. Dingwall.
39. Kello.
40. The indentations of the Western coast are much more numerous than those on the Eastern.
41. In Perthshire.
42. Leith.
43. Cromartie, Nairn, Kinross, and Clackmanan.
44. At the Southern end.

45. Yes: that of Cantire.
46. Of Wigtown.
47. By Sutherland.
48. It lies opposite to the South West corner of the Isle of Mull.
49. Fifty-five Degrees North.
50. That of Edinburgh is 3° West, and that of Fort William 5° West, so that their difference of Longitude is 2° .
51. Under the parallel of 56° North.
52. Inverness, Rutherglen, and Kircudbright.
53. Skye.
54. Kirkaldy.
55. Cullen and Bamff.
56. They extend from Aberdeen to Argyleshire.
57. The Isle of Arran.
58. The Lammer-Muir Mountains.
59. About two degrees.
60. On Solway Frith.
61. Irwin is to the North of Air.
62. Skalloway and Larwick.
63. In Murrayshire.
64. The River Don.
65. Brechin is situated to the West of Montrose.
66. Fortrose.
67. Of Cathness.
68. Dornock stands on the Northern, and Taine on the Southern shore of Dornock Frith, exactly opposite to each other.
69. Scotland is nearly divided into two parts, by the Friths of Forth and Clyde: its greatest breadth is from Peterhead to the Western side of Rosshire.
70. Clackmanan.
71. By the river Forth.
72. Rothsay.
73. In the North of Aberdeenshire.
74. Frazerburgh.
75. Stranraer.
76. In Berwick, or Merfeshire.
77. Kelso.
78. Argyleshire.
79. In Lanerkshire.
80. In Airshire.

VIII. ANSWERS TO THE QUESTIONS FOR EXERCISE ON THE MAP OF IRELAND.

1. The Northern part is called the Irish Sea, and the Southern, from Cardigan Bay, obtains the name of St. George's Channel.
2. The counties of Antrim and Down in Ireland, and that of Wigtown in Scotland.
3. By the Atlantic Ocean.
4. In the county of Antrim.
5. Cape Clear.
6. Kerry.
7. The boundaries of Antrim are formed principally by the Sea, the river Bann, and Lough Neagh. The limits of Clare, too, consist chiefly of water. Down has a great portion of sea-coast, and the same may be said of Donegal.
8. Tyrone, Leitrim, Cavan, Monaghan, Roscommon, Longford, West Meath, King's County, Queen's County, Kildare, Tipperary, Kilkenny, Carlow, and Limerick, have none of them any communication with the sea, but by Rivers.
9. The river Shannon separates Roscommon from Leitrim, Longford, West Meath, and King's county. Galway from King's County, and Tipperary; and Clare from Limerick and Kerry.
10. On the Liffy.
11. It rises in Wicklow, takes a considerable sweep through Kildare, and divides the county of Dublin into two nearly equal parts.
12. The river Bann.
13. Clare.
14. In the province of Connaught.
15. Inniskillen.
16. Lough Swilly.
17. In the South of the county of Tyrone.
18. Armagh, Tyrone, Londonderry, and Antrim.
19. Maryborough, Portarlington, Athy, Carlow, Leighlin, and Ross.
20. The river Suir.
21. Tipperary and Waterford border on Leinster, and King's County, Queen's County, and Kilkenny, in that province lie contiguous to them.
22. In Galway.
23. The river Boyne.
24. By King's County, Kildare, Carlow, Kilkenny, and Tipperary.
25. Wexford.
26. It stands on an arm of the Sea, which penetrates the county to a considerable distance, and forms a very commodious Harbour.
27. They lie nearly North and South of each other, differing a little less than a degree in Latitude, consequently their distance in a direct line is not quite $69\frac{1}{2}$ English miles.
28. Nearly 53 degrees North.
29. Ten Degrees West.
30. Cavan lies to the East of Kilmore.
31. No.
32. King's County.
33. In Antrim on Carrickfergus Bay.
34. Ennis lies North from Clare.
35. The island of Killeny, and several smaller ones, are interposed at the mouth of Galway Bay.
36. In Donegal.
37. It communicates with Lough Foyle.
38. Naas.
39. Ross, in Cork.
40. Lifford lies two degrees more to the Westward than Down Patrick.
41. Colerain.
42. The Longitude of Donaghadee is a little less than 6° , that of the place sought must therefore be a little less than 10° , which is the case with Tralee.
43. They are Leitrim, Carrick, Athlone, Clonsfert, Killaloe, and Limerick.
44. Dingle, Tralee, Galway, Sligo, and Donegal.

45. The one is Killala, and the other Killaloe; the former in Mayo, the latter in Clare.
46. Lismore lies nearly under the the parallel of 52° , Dundalk as far beyond that of 54° , and is therefore 2° to the North of it.
47. Of West Meath.
48. The river Boyne passes Trim, and falls into the sea below Drogheda, after having, for a short distance, formed the boundary between Louth and East Meath.
49. In Leitrim.
50. In Tipperary.
51. Dingle.

52. Twelve.
53. Mayo, Castlebar, and Ballinrobe, in the county of Mayo, have that position with respect to each other.
54. The one in Wexford the other in Cork.
55. Strangford Bay is formed by the Beak-like peninsula on which Donaghadee stands.
56. The Mullet, in Mayo.
57. No.
58. West Meath would lie to the right hand, East Meath to the left, and Kildare before me.
59. Near the town of Kildare.
60. North Cape, or Hoar Head, and Fair Head.



ERRATA.

GENERAL DIRECTIONS line 15 and 16 for *towers* read *towns*.
19 for *Rishney* read *Nishney*.

P. 6 20 insert a comma after *it*.

ELEMENTS OF GEOGRAPHY P. 15 l. 18 for *angels* read *angles*:

P. 19 l. 12 for 60° read 65°

P. 21 l. 6 for *when* read *where*.

P. 21 l. 40 for *depends* read *depend*.

APPENDIX line 26 for *track* read *tract*.

line 28 for *points* read *parts*.

REFERENCES TO MAP OF EUROPE line 29 30 31 dele *the last three are on the Me-*
diterranean.

of Asia line 14 15 between *Siriam* and *Ma-*
lacca insert *Siam* and *Cambodia*.

of Africa line 31 and *seg* read *Bornou* before
Tombuctoo or *Tombut*.

37 for *Monomotapa* read *Mon-*
emugi.

of America line 12 and *seq.* dele *on V the*
Gulph of Mexico.

QUESTIONS to the World No. 21 for *westerly* read *easterly*.

to Asia No. 13 for *Indoſtan* read *Iſpahan*.

No. 63 read *How is Georgia ſurrounded?*

Answers to the World No. 30 insert *equal* after *two*.

to England and Wales No. 29 for *Somerſetſhire* read *Glouceſterſhire*.